UTAH MUSEUM OF NATURAL HISTORY

INTERPRETIVE OUTLINES

80% FINAL DESIGN DOCUMENTS
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CANYON

Spanning the length of the building from west to east, a dramatic three-story "Canyon" serves as the institution's main circulation hub , an iconic exhibit and public events venue.

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/SPECIMENS	GRAPHICS
CN1 Topo model			Below one of the bridges that spans across the Canyon, a group of visitors gather around a large topographic model of the State of Utah and surrounding Intermountain Region. The model will serve as a gathering point for large tour groups and serve as a starting point to orient visitors to the museum and the State.				
	CN1.E01.sx01	special exhibit	Topo model with labels highlight major geographic features, state boundaries, National and State Parks, city and town names, mountain peaks.				
	CN1.E01.sx02	special exhibit	laser pointer tethered to the rail enables visitors to point out features of the map.				
	CN1.E01.ap01	activity prompt	prompts visitors to use the pointer.				
CN1.E01.gr01		graphic rail	Land Ownership				
	CN1.E01.fp01	focus panel	Focus panel describes land ownership in Utah.	Utah and the Intermountain West are rich with natural and cultural history. Utah's lands are owned and managed by the state, the federal government and its agencies, and private interests. These groups don't always agree on land management issues.	Federal and state agencies manage nearly 80% of Utah's lands. Much of this territory is parks and used by residents and visitors for recreation. It's difficult to balance the needs of these recreational users against development and preservation. The vast majority of land in Utah is public - owned by the federal government. And there has long been a struggle over what to do with pieces of that land (whether to allow cattle grazing, mining and development, or whether to ban motorized travel and preserve the land as wilderness). Virtually everyone favors preserving land that has true wilderness value. The question centers on where you draw the lines – what parcels are included and what are not – and who makes those decisions. Some in rural Utah argue they should have a major say in decisions regarding this land, since the outcome will have a great impact on their lives. Others argue that southern Utah is a national treasure belonging to all of us – that its significance far outweighs local interests.		
	CN1.E01.gi01	graphic image	map of state showing parks, monuments, trails, etc.				
	CN1.E01.gc01	graphic captions	Captions for map showing parks		Utah has 45 state parks, 5 National Parks, seven National Monuments, two National Recreation Areas, a National Historic Site and six National Forests. These spectacular recreation areas preserve thousands and millions of years of human and pre-human history. You can see dinosaur bones, petroglyphs, and lots of wildlife. Please do visit Utah's parks, and remember to visit responsibly, and leave no trace.		
CN1.E01.gr02		graphic rail	Features				
	CN1.E01.fp03	focus panel	Focus panel lists Utah's named features- mountain ranges and waterways				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/SPECIMENS	GRAPHICS
	CN1.E01.gi03	graphic image	map highlighting features				
	CN1.E01.gc03	graphic captions	Graphic captions for map				
CN1.E01.gr03		graphic rail	Demographics				
	CN1.E01.fp02	focus panel	Focus panel explains Utah demographics and population trends	Utah's population is growing rapidly; most people live in urban areas. Of the 50 states, Utah has the youngest population; one of the highest birth rates; the second lowest death rate; the healthiest population; the highest literacy rate; the highest percentage of high school graduates; and the highest number of people with a college education.	Utah's population is relatively small, but it's growing rapidly. In the 1900s, minorities and immigrants came to Utah, changing the demographic profile. The state's population is young, and increasingly diverse in race and culture. Utah enjoys the nation's highest birthrate at 2.4 percent. And at 28.5 years, Utah has lowest median age in the country. Since Utah also enjoys one of the nation's highest levels of high school graduation (91.2 percent) and since 27 percent of Utahns hold bachelors degrees. The U.S. Census Bureau projects that Utah's population will approach just over 4 million residents by 2030, which places Utah as the fifth fastest growing state. Another telling statistic is that while Utah is the youngest state in the nation and will remain so for the foreseeable future, it is also the second fastest growth area for elderly population growth. That's because Utahns live longer. 10 counties in Utah are part of metropolitan areas, and 5 counties are part of micropolitan areas. The micropolitan category defines counties that include an urban area with a population of 10,000 to 49,999 plus surrounding counties that are linked through commuting ties. Much of the population lives in cities and towns along the Wasatch Front, a metropolitan region that runs north-south with the Wasatch Mountains rising on the eastern side. The rest of the state is mostly rural or wilderness. Utah has a higher percentage of people sharing a single religious denomination than any other state. Utah contains 5 metropolitan areas (Logan, Ogden-Clearfield, Salt Lake City, Provo-Orem, and St. George), and 5 micropolitan areas (Brigham City, Heber, Vernal, Price, and Cedar City). Most Utahns are of Northern European descent. http://utah.wedding.net/demographics.html		photos of diverse Utah residents; from different parts of the state; bullet pt. Demographics?
	CN1.E01.gi02	graphic image	Photos of Utah residents				
	CN1.E01.gc02	graphic captions	Graphic captions for Utah residents photos				
CN1.E01.gr04		graphic rail	Attractions				
	CN1.E01.fp04	focus	Attractions and unique features of Utah: parks, excavation sites				
	CN1.E01.gi04	graphic image					
	CN1.E01.gc04	graphic captions					

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/SPECIMENS	GRAPHICS
CN2 Canyon Collections Wall			Visitors see an iconic, 3 story display of specimens and artifacts from the institution's collection located behind an internally lit collections showcase. At the base of this case a layer of interpretive graphics reveal that this seemingly eclectic grouping of objects corresponds to the thematic organization of the museum's eight permanent exhibitions. These graphics and lower level objects provide an advance-organizing experience for the visitor.				
	CN2.sx01	special exhibit-	Canyon collections wall				
	CN2.E01.ar01	artifact label	Label describes Utah Sky				
	CN2.E01.ar02	artifact label	Label describes Native Voices				
	CN2.E01.ar03	artifact label	Label describes Life				
	CN2.E01.ar04	artifact label	Label describes Past Worlds				
	CN2.E01.ar05	artifact label	Label describes First Peoples				
	CN2.E01.ar06	artifact label	Label describes the Great Salt Lake				
	CN2.E01.ar07	artifact label	Label describes Land				
	CN2.E01.ar08	artifact label	Label describes Utah Futures				
CN2.E02							
	CN2.E02.qt01-qt04	quotes	Quotes are inscribed on various facets of the North walls of the canyon	about natural history, nature, our relationship with the natural world, Utah			
	CN2.E02.qt04-qt08	quotes	Quotes are inscribed on various facets of the South walls of the canyon	about natural history, nature, our relationship with the natural world, Utah			
	CN2.E02.fp01	focus panel	Focus panel describes the overall organization of the museum. identifies each exhibition and describes the artifacts and specimens that you might see there and the branches of science they represent.	For billions of years Utah has gone through extreme changes that continue today and into the future. You are part of this change, so explore the museum and our collections and find your connections to Utah's Natural History.	The museum is organized into eight thematic exhibitions, including Utah futures. These offer distinct, yet connected, perspectives on our world, past and present. The exhibitions are linked by literal and virtual Trails that emanate from a Trailhead in the Canyon. The Trails lead to outdoor exhibits and trails that take advantage of the new museum's spectacular site, and also to parks, sites, and geologic features across the state. Explore our museum, our site, and our state.		
CN3 Collections Storage Window			A Collections Window provides a view into the working area of the curators and staff , where they can be seen documenting, preserving and interpreting the institution's collections.				
	CN3.E01.si01	section intro	Section intro describes collections storage; role of research and collections in the museum and in science.	Collecting, conservation and interpretation are essential to understanding our natural world.	This museum is much more than its public exhibitions. The Utah Museum of Natural History's collections form the basis for all of the Museum's educational functions, from public exhibits and programming to scholarly research and publication. The Museum's systematic collections in the fields of earth sciences, biology, and anthropology rank among the largest and most comprehensive for the western United States. While emphasizing the Great Basin and Colorado Plateau, they also include material from throughout the world. These collections are the foundation for research on some of the fundamental phenomena of biological science: evolution, ecology, climate change, biogeography, behavior, agriculture, and, if they include the human sciences, culture. Our collections record the past, and give us insights into the future.		

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/SPECIMENS	GRAPHICS
	CN3.E01.pm01	photomural					
	CN3.E01.qt01	quote	Quote about collections located near the window to the collections area				
	CN3.E01.sp01	story panel	Story from collections manager				
	CN3.E01.sp02	story panel	Story from curator or adjunct curator				
	CN3.E01.sp03	story panel	Story from collector/collector's council member				
	CN3.E01.ar01-	artifact labels	Changeable artifact labels		Labels for new acquisitions, newly studied items	Objects to be selected by UMNH	
CN4 Trailheads			Throughout the Canyon, in both pre-pay and pay areas, visitors encounter a set of 6 Trailhead interactive stations which provide tools for planning their day at the museum and offer recommendations for extending their experience beyond the walls of the museum at the end of your visit.	The Trailheads mark the beginning of a larger journey — one that connects visitors to a community of like-minded people and introduces them to the museum's many partners, programs and sites across the State of Utah.			
	CN4.E01.av01-av06	av	6 interactive touchscreen stations where visitors can plan their visit and make connections to trails and sites, partner institutions and resources in Utah.				
CN5 Mineral Collection			At the second level a hallway traverses the north side of the Canyon connecting to the Changing Exhibits Gallery. Embedded in the walls of this passage is the institution's mineral collection, set into dramatically lit wall niches that visitors can explore as if they are discovering the minerals embedded in the 'geology' of the building.				
	CN5.E01.si01	section intro	Section intro for minerals	Minerals are diverse in shape, color, form and chemical composition.	Minerals form through natural processes in the earth; they are solid and have a specific chemical composition and a characteristic crystal structure. We use minerals in many ways, thanks to their different properties (shape, hardness, density and color). Minerals are the building blocks of rocks. Minerals give us pigments for dyes and paints, metals like lead for batteries and copper for insulation, salt, and, of course, gemstones. You have minerals in your body that help strengthen your bones and keep your cells running.		
	CN5.E01.qt01	quote	Quote related to the minerals of Utah				
North Wall	CN5.E01.ic01	inset case	Inset case holds Utah minerals				
	CN5.E01.fp01	focus panel	Focus panel describes Utah minerals	Utah is a treasure trove of minerals.	During the past billion years, geologic events and processes have created Utah's diverse mineral resources. In each of the state's geologic provinces (Basin and Range, Colorado Plateau, Middle Rocky Mountains), different geologic processes resulted in different kinds of minerals. Utah's state mineral is copper, and the state gem is topaz.		map of Utah showing counties, location of mines
	CN5.E01.sp01	story panel	Story from mineralogist				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/SPECIMENS	GRAPHICS
	CN5.E01.ar01-ar45	artifact labels	Labels for Utah minerals			45 specimens total	
	CN5.E01.gi01	graphic image	Map of Utah and places of mineral origin				
	CN5.E01.pm01	photomural	Photomural tbd				
	CN5.E01.ic04	inset case	Inset case holds minerals of different colors				
	CN5.E01.fp04	focus panel	Focus panel describes variety in mineral color and shape	There are more than 5000 different minerals. They are all colors of the rainbow (and black, white and clear), and grow in many shapes.	Some minerals always have the same color, such as gold, whereas some minerals, such as quartz and calcite, come in all colors. Color is determined by the presence and amount of chemical elements. Impurities in clear or white minerals can change their colors. The natural growth (shape) of a mineral is called its crystal form. This shape is based on the internal arrangement of atoms. Shapes vary from needles to columns to fibers. You might think of minerals as being crystals - regular geometric shape - and that's usually true. But sometimes minerals have irregular and even rounded shapes, and these may resemble organic shapes.	60 specimens	
	CN5.E01.gi02	graphic image	crystal shape diagrams				
	CN5.E01.gc01	graphic caption	graphic caption explains minerals shapes				
	CN5.E01.ar01-ar54	artifact labels	Labels for minerals of different colors				
South wall	CN5.E01.ic02	inset case	Inset case holds crystals large and small			27 specimens	
	CN5.E01.fp02	focus panel	Focus panel describes crystals large and small	Most mineral crystals are small, but occasionally, under exceptional conditions, very large crystals form.	Crystals form when fluid with materials in it solidifies. They have orderly, geometric shapes. Crystals come in many shapes and sizes, from a grain of salt to some of the large crystals you see here. It's unusual to find single, large crystals. Usually crystals form in tight spaces, so you get a cluster of smaller crystals rather than one large one. Also, it takes time for a crystal to form; a large crystal needs a stable environment for the time it takes to solidify. The largest authenticated crystal of any type is a beryl from Malakialina, Malagasy Republic more than 54' long , 11 /2' in diameter, and weighing about 860,000 pounds! refs: Palache, American Mineralogist, Volume17, pages 362-363, 1932 Rickwood, American Mineralogist, Volume 66, pages 885-908, 1981		
	CN5.E01.ar01-ar22	artifact labels	Labels for crystals large and small Note: label format is credit line name location formula in very small type			quartz, gypsum "fishtail twin", tourmaline var. schorl with quartz, topaz (blue), stibnite, corundum var. sapphire, galena, tourmaline var. elbaite, microcline var. amazonite, fluorite with calcite, pyrite	

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/SPECIMENS	GRAPHICS
	CN5.E01.ic03	inset case	Inset case holds gemstones				
	CN5.E01.fp03	artifact group label	Group label describes gemstones		People have long prized gemstones for their color and beauty, and have associated them with mystical properties (medicinal, good and bad luck, protection, and prophecy). Birthstones (gemstones associated with each month) have been used since at least the first century. A gemstone such as diamond, opal or pearl is a mineral, rock, or organic material that is used for jewelry, ornamentation, or art. A gem, such as a diamond or emerald, is a type of gemstone that must be cut and polished for its beauty to be visible. A precious gemstone has beauty, durability, and rarity, whereas a semiprecious gemstone has only one or two of these qualities. Gemstones occur in most geologic settings, but they are rare, and tend to be scattered through a rock or fill small veins and cavities. sources: http://pubs.usgs.gov/gip/gemstones/notes.html	117 specimens: varascite, andaluscite, beryl var. aquamarine, beryl var. emerald, blue topaz, golden topaz, rose quartz, gold, spodumene var. kunzite, corundum var. ruby, corundum var. sapphire, diamond, opal, garnet, tourmaline var. elbaite, turquoise, fire agate, quartz var. citrine, quartz var. amethyst, clear or colorless quartz, spalerite, morganite, cuprite, fluorite	
	CN5.E01.ar01-	artifact labels	Labels for gemstones				
	CN5.E01.ic05	inset case	Inset case holds filamentary/acicular/radiating minerals			millerite, cuprite var. chalcotrihite, boulangerite, pseudomesolite, stibnite, gypsum, creedite, wavellite	
	CN5.E01.ar01-	artifact group label	Labels for minerals				
	CN5.E01.ic06	inset case	Inset case holds twinning/ reticulation/rosettes minerals			cerussite, rutile, chrysoberyl, calcite, gypsum, barite	
	CN5.E01.ar01-ar02	artifact group label	Labels for twinning/ reticulation/rosettes minerals				
	CN5.E01.ic07	inset case	Inset case holds phantoms/inclusions/zoning minerals			fluorite w. chalcopyrite, rutile in quartz, calcite w. sand	
	CN5.E01.ar01-	artifact group label	Labels for minerals				
	CN5.E01.ic08	inset case	Inset case holds pseudomorph minerals			goethite after pyrite, tincalconite after borax	
	CN5.E01.ar01-	artifact group label	Labels for pseudomorph minerals				
	CN5.E01.ic09	inset case	Inset case holds botryoidal, mammilary, stalactitic, dendritic minerals			hematite, smithsonite, aragonite, malachite, dendritic tbd	
	CN5.E01.ar01-	artifact group label	Labels for minerals				
	CN5.E01.ic10	inset case	Inset case holds minerals of different shapes and habits				
	CN5.E01.ar01-	artifact group label	Labels for shapes and habits			25 specimens	
	CN5.E01.ic11	inset cases	Inset cases holds fluorescents; w. 1" viewing slit and light, long wave UV and short wave UV; case at child-friendly height				

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	CN5.E01.ar01-	artifact group label	Group label describes fluorescents with prompt to push button for lights		Fluorescent minerals are minerals show their hidden colors when viewed with ultraviolet light. They emit light when activated by UV; this is sometimes very colorful and very different from the normal color of the mineral. Most minerals do not fluoresce when pure. Certain impurities (activators) in certain quantities make the mineral fluoresce. In this exhibit, you'll see minerals under regular light, then watch them dazzle under shortwave and longwave UV light.		
	CN5.E01.ar01-	artifact labels	Labels for fluorescents				
	CN5.E01.ap01	activity prompt	Activity prompt explains how fluorescents are activated by UV lights and tells visitors to push the different lights to observe the reaction.				

FIRST PEOPLES

For 11,500 years, Utah's ancient peoples made life decisions based on their physical and social environments. Archaeologists discover these choices through the study of material culture.

1. Archaeologists study artifacts to learn about ancient peoples' behavior.
2. Like you, ancient peoples behaved distinctly based on where they lived.
3. In this region, archaeologists distinguish Numic, Formative, Desert-Archaic, and Paleo-Archaic "complexes."

Utah's Ancient Peoples tells the story of the prehistoric residents of Utah using evidence of ancient technology, settlement, subsistence, and exchange. Case studies throughout the observatory highlight the cultural history of the region. Visitors also see how archaeologists reconstruct how ancient peoples lived through studying the artifacts they left behind. Visitors can be archaeologists, too, making their own inferences, and participating in hands-on activities around the Median Village dig site reconstruction and elsewhere in the Observatory. In the Current Research area, visitors will discover that archaeologists work with other scientists to reconstruct past climates and ecosystems, and will learn about the Museum's recent work at Range Creek.

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
FP1 Introduction			This observatory has 2 entrances, and exhibits at each introduce one of the main themes of the observatory. Coming from land, visitors are inspired by the process of archaeological discovery. The other introductory exhibit invites visitors to compare their handprints to ancient rock art images of hands, and to leave their handprint on a heat-sensitive surface.				
FP1.E01							
	FP1.E01.ip01	intro panel-Range Creek	Title, grabber, text	Archaeology is the scientific study of peoples of the past - their culture and their relationship with their environment	People have lived in what is now Utah for the past 11,500 years, making decisions based on their social and physical environments. Archaeologists study the objects left by past peoples to understand their behavior. Interpretation changes, the objects remain the same - they are the facts. These data have 3 dimensions - time, space, and behavior. It's important to locate objects in space and time; in this gallery you'll see how archaeologists do this, and how the interpret ancient objects to learn how Utah's ancient peoples made their livings, settled, and traded.		photomural of an active archaeological site w/team at work; photo of Range Creek
FP1.E01.ic01		inset case	Case for Range Creek object assemblage			a0508, a0517, a0520, a0528, a0537, a0540, a0545, a0582, a0589, a0998, a0999, a1000, a1009, a1010, a1011, a1017, a1028, a3117, a3118	
	FP1.E01.ar01	artifact label	Label for Range Creek artifacts				
	FP1.E01.pm01	photomural	Archaeologists at work in Range Creek				
	FP1.E01.gc01	graphic caption	Caption for photo mural				
	FP1.E01.qt02	quote/question	Quote/question adjacent to ramp coming down from Land				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	FP1.E02.ip01	intro panel- Rock Art	Title, grabber, text Introductory panel made of pressure-sensitive material shows rock art hand prints (negatives and positives) and invites visitors to compare their own hand prints to the rock art, and to imagine the lives of the peoples who carved their hand prints in stone thousands of years ago.	Thousands of years ago, early Utahns carved handprints into rocks and canyon walls.	Rock art is difficult to interpret - we can never know what the intent of the artist was, or who the artist was, or what they intended to represent. Yet rock art, like the thumb prints in an ancient mug, or a carefully mended moccasin, connect us directly to the people of the past. This human connection, and desire to understand our cultural history, is key to archaeology. Add your handprint to the panel, and connect to Utah's past.		collage of rock art hand images
	FP1.E02.pm01	photomural	Rock art photomural				
FP2 Reading a Site and Architecture			The Median Village reconstruction answers the questions "what did people live in," "how do archaeologists know?" and "what do archaeologists do?" and lets visitors become archaeologists through hands-on activities. Visitors sift for pot sherds with a special hand held interactive and turn on the grid gobo to map the site. Visitors can enter the site and lift discovery objects to learn how the site was used.				
	FP2.E01 Median Village Reconstruction						
	FP2.E01.st01	section title	Section title for Median Village exhibits.	title and subhead	You are looking at a recreation of part of an actual archaeological site. You'll see how archaeologists analyze a site, and use your own eyes and hands to make observations. You can climb into the site and look at its features up close.		
	FP2.E01.sx01	interactive- lift panel	Visitors lift pottery shards				
	FP2.E01.ap01	activity prompt		Why so many pottery fragments?			
	FP2.E01sx02	interactive- lift panel	Visitors lift panel with points		This might have been where pottery was made, or the storage area, or a household with a lot of pots. What's your guess?		
	FP2.E01.ap02	activity prompt		Why are all the points in one pit house?	This might have been where points were made, or perhaps they were just discarded here. What do you think?		
	FP2.E01.sx03	interactive- lift panel	Visitors lift panel with burnt corn cobs				
	FP2.E01.ap03	activity prompt		What might the burnt corn cobs mean?	Corn didn't come from the supermarket, it was grown. The burnt cobs might be in what was a fireplace. Alternatively, this area might have been where refuse was dumped.		
FP2.E01.gr01		graphic rail					
	FP2.E01.in06	interactive- Mapping A Site	Gridding interactive; visitors activate a grid gobo that projects a light grid over the site, then map a section of the grid.				
	FP2.E01.ap06	activity prompt	Activity prompt for mapping activity	Press the button to light up a grid.	Draw what you see in each grid. This is what archaeologists do when they map a site. Recording the information before you start digging is critical.		photo of archaeologists mapping a site
	FP2.E01.in07	interactive- Sifting	Visitors sift through sand to find pot sherds.				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	FP2.E01.ap07	activity prompt	Activity prompt for sifting activity	Turn the handle of the drum.	Turn the handle of the drum, and watch the pottery shards emerge. Archaeologists in the field use large sieves to sift through cubic feet of dirt. This way they catch every bit of physical information from the site.		photo of archaeologist sifting for artifacts
FP2.E01.gr02		graphic rail					
	FP2.E01.ms01	Mindset	Mindset text describes the site and the fieldwork done there, and invites visitors to explore for themselves.	Archaeologists use both fieldwork and laboratory analysis to form hypotheses about how peoples of the past lived. You can use some of these techniques to "study" the Median Village site recreation.	This is a full-scale recreation of part of Area B of the Median Village site in the Parowan Valley. Median Village is a Fremont site that was abandoned about A.D. 1050. The site you see here represents the 1968 work. The trench you see is a test trench dug by a backhoe. A test trench gives archaeologists a sense of what types of objects and features they might encounter throughout the site. Area B includes several pit structures, some with central firepits, and several storage structures. Textiles, ceramics, chipped stone artifacts, ground stone artifacts, and worked bone artifacts were found at Median Village. A lot of vertebrate bones were found at Median Village, more than at other Fremont sites, perhaps indicating a greater reliance on hunting. Study of Median Village has contributed to our understanding of regional variation in the Fremont culture. this is mostly from Marwitt, Median Village and Fremont Culture Regional Variation		photos of Median Village being worked, aerial view of Median Village; photos of types of artifacts found there
	FP2.E01.fp01	focus panel	Focus panel text discusses the Fremont of Median Village	The people who lived at Median Village grew corn, beans, and squash, and hunted large and small animals.	Median Village (AD 900-960) is situated at 5850 ft and is located on a gently sloping alluvial fan that originates at the mouth of Summit Canyon. The occupants of Median Village grew corn and probably beans and squash as well. The evidence for this is charred corncobs, and a granary found on the site. In addition to farming they relied heavily on hunting mule deer, mountain sheep, jackrabbits, and birds. The great quantity of bone scrap suggests that hunting was an important part of their diet. It is probable that the village was occupied year round. People lived in pithouses and stored their corn through the winter months in a large, rectangular, coursed-adobe, surface structure (Marwitt 1970). The pithouses at Median Village were substantial enough to presume that the amount of effort put forth to construct them indicates their intention of occupying that locality for several years. The presence of a surface granary indicates a desire for long term storage of consumables through the winter months. Another indication of year round use is the fact that the granary is not hidden; there is no need to conceal food storage if at least some of the residents will be around to guard it from raiding outsiders.		photos of corn cobs, granary, animal bones, pithouses

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	FP2.E01.in08	interactive- Be An Archaeologist	Be an Archaeologist interactive: visitors analyze the site with various configurations of artifacts	People lived at Median Village over many years; they left the village and came back, rebuilding on top of the old village.	What you see: a stack of clear panels with a map of the site on the top panel What you do: lift up the right and or left panels to reveal different layers of the site; you can lift both left and right, or just right What you get: an understanding of the principle of superposition		
	FP2.E01.ap08	activity prompt	Activity prompt for be an archaeologist interactive	Reveal the layers of the site.	Lift the panels to see the layers of the site. Which do you think is the oldest layer? Can you arrange the panels to match the site in front of you?		photo of archaeologists working a site, preferably handling artifacts
	FP2.E01.rc01	rail case	Rail case holds objects from Median Village			A2714-2745	
	FP2.E01.ar04	artifact label	Group label for Median Village objects				
	FP2.E01.in03	interactive- Touch artifacts	Visitors touch real objects typical of Fremont sites.			A2749-53	
	FP2.E01.ar03	artifact label	Label and please touch for touch objects		label and please touch--prompt should focus on meaning? (e.g. if you find a corn cob, what do you think it means? if you see charcoal in the dirt and charcoal represents burnt objects, what does this charcoal tell you about the site? Etc.		
FP2.E01.gr03		graphic rail					
	FP2.E01.rc02	rail case	Rail case holds objects related to structures and architecture			A2746-48, A2451	
	FP2.E01.ar02	artifact label	Label for architecture objects				
	FP2.E01.gc01	graphic captions	Graphic captions describe architectural styles and functions, and distinguishes communal from individual or family structures.		Ancient peoples created different kinds of structures, from temporary brush shelters to houses, storage structures, and above-ground pueblos. They also used caves as shelters. Fremont village sites include deep circular and square pithouses and adobe surface structures, which were typically used as granaries. The Ancient Puebloans built pithouse, and a combination of pit structures and above ground pueblos. A pit-house is a structure dug into the ground. Many different peoples built pit houses, including the people of the American Southwest, including the ancestral Pueblo, the ancient Fremont culture, the Cherokee, the Inuit, the people of the Plateau, and ancient residents of Wyoming. Usually, all that remains of the ancient pit-house is a dug out hollow in the ground, roofbeams and any postholes that held the posts that supported the roof. Walls and roofs were made of poles, brush, and clay. Archaeologists used to think ancient peoples lived in the pit houses, now they think the pit houses were probably used for storage.		architectural drawings (plan and section) of each type of dwelling photo of pithouses, jacal structures, adobe structures, rock shelters, cliff dwellings, caves; masonry structures; ceremonial structures; rendering of brush shelter
	FP2.E01.pm01	photo mural	Photomural of Median Village surroundings on back of case.				
	FP2.E01.gc02	graphic caption	Caption for photomural				
	FP2.E02.qt01	quote/question	Quote/question on rail		about how people lived; quote from tribe about ancestors?		
FP3 Dry Caves- (Learning Lab)							

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	FP3.si01	section intro	Section intro orients visitors to dry caves	Utah, like the rest of the Southwest, is a good archaeological natural laboratory because the climate is dry, and objects don't rot. Pieces of cotton, woven materials, and sandals made from plants have all survived.	Utah's dry caves are like time capsules, preserving layers of detail of prehistoric inhabitants. Pieces of cotton, woven materials, leather, and sandals made from plants have all survived. The cave record tells us there were people living in Utah more than 11,000 years before present.		
FP3.E01 Dry Caves			Scenic cave recreation with inset cases shows visitors examples of cave preservation.				
	FP3.E01.sx01	special exhibit	Scenic construction of cave interrior with inset cases				
	FP3.E01.ic01-ic06	inset cases				Danger Cave a3110, a3111, Promontory Cave a3112, a3113, Hogup Cave a3114, Cowbot Cave a3115, a3116	
	FP3.E01.ar01-ar06	artifact labels					
FP3.E02 Sudden Shelter/ Relative Dating			At the recreation of Sudden Shelter stratigraphy visitors see points found at different layers. Real points are displayed in inset cases to the right of the sand stratigraphy. A photomural/diagram of Sudden Shelter gives context to the sand layers.				
	FP3.E02.sx01	special exhibit	sand stratigraphic column with embedded cast points; a stratigraphic diagram of Sudden Shelter indicates the layers.				
	FP3.E02.gi01	graphic image	sand layers				
	FP3.E02.pm01	photo mural	Photomural of Sudden Shelter				
	FP3.E02.ms01	mindset	Mindset text explains relative dating	Before the discovery of absolute dating techniques, archaeologists relied on relative dating to order events. Stratigraphy is based on the principle that lower layers are older than the layers above.	Prior to the discovery of absolute (direct) dating techniques, archaeologists depended on relative (indirect) dating techniques to give temporal order to past events. Relative dating of a sequence of rocks or artifacts tells us which is older and which is younger, but not how much older or younger. In archaeology, several relative dating techniques are used, typological classification and stratigraphy being the most common. Each method has its own criteria, assumptions, and restrictions. For instance, for stratigraphy, the criteria is that the layers must be definable; the assumption that the Law of Superposition holds true, and the restriction that the sequence not be altered.		

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	FP3.E02.fp01	focus panel	Focus panel explains stratigraphy and describes why Sudden Shelter is such a good example.	Sudden Shelter cave, in Sevier County, is one of the best examples of stone point stratigraphy. Sudden shelter is unique due to its tight stratigraphic distribution of projectile point types. It, better than any other reported site, clearly demonstrates a succession of several widely known lithic technologies and introduced several projectile point types previously unknown at the time. (MK)	Stratigraphy is the study of rock and soil layers. The layering of deposits follows the Law of Superposition, which states that the oldest deposit is on the bottom of a column of sediments and the most recent deposit is on the top, barring any disturbance to the layers. This method orders layers according to assumed time of deposition, it doesn't indicate when an object was made. Sudden Shelter was excavated by the University of Utah in 1974 to recover archaeological information that was about to be destroyed due to road construction. It was discovered that this rock shelter in Sevier County had exceptionally rich and well-stratified Archaic components that date back to 8000 B.P. Sudden shelter is unique due to its tight stratigraphic distribution of projectile point types. It, better than any other reported site, clearly demonstrates a succession of several widely known lithic technologies and introduced several projectile point types previously unknown at the time.		photos of Sudden Shelter dig, photos of site,
	FP3.E02.gi02	graphic image	Diagram of stratigraphy				diagram of stratigraphy
FP3 Dry Caves-(Learning Lab)		insect cases					
	FP3.E02.ar01-ar06	artifact label	Group label in each case describes the different types of points found at Sudden Shelter (associated w. inset cases and diagram)		A total of 453 projectile points was recovered in the 1974 excavation. Of these, 411 are sufficiently complete to be identified with a particular class. The 411 points were classified into 12 types; 8 fit into an existing named series and 4 were new types defined during the analysis. An examination of change through time of the projectile point density suggests variations in the intensity of occupation at the site within the three occupation periods represented: Sudden Shelter I, Sudden Shelter II, and Sudden Shelter III. In Sudden Shelter I, Pinto series points predominate until replaced by the Elko series; at this time point density increases, later there is a decrease in use of the shelter but 3 new points are introduced. In Sudden Shelter II, the point types change significantly with an increased use of the Sudden-side notch point. At the beginning of Sudden Shelter III, the Gypsum and San Rafael side-notch points coincide with increased occupancy of the site.	level 1: A0328, level 3: 0246, 0251-53, level 5: A0240-1, 0245, 0255-6, A0259-60, 0262-65, A0267, 0283, level 6: 0269-70, 0272, 0275-7, level 7: A0249, 0254, 0257, 0258, 0266, 0271, 0274, 0278-82, 0284-95, level 9: A0244, 0296-301, level 14: A0247, 0261, 0303-5, level 15: A0308-10, 0312-17, 0319, level 16: A0236, 242, 318, 320, 321, level 20: A0322-3, level 21: A0324-27, level 22: A0233	
FP3.E03 Theater			When classes aren't using the classroom, existing films are shown, including the Range Creek video.				
FP3.E04 Absolute Dating	FP3.E04.ic01	inset case	Inset case with Promontory moccasins				
	FP3.E04.gp01	graphic panel					

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	FP3.E04.ms01	mindset	Mindset text reviews absolute dating and explains C14 dating.	Absolute dating methods let archaeologists date artifacts, sites, and events in calendar years. Unstable elements decay at known, constant rates; they can be used to date artifacts and associated organic material.	Archaeologists need to place objects in the contexts of space and time. Absolute dating, developed after the discovery of radioactivity, allows them to associate a numerical date with an object or rock/soil stratum. Absolute dating methods include radiocarbon (C14) dating, potassium argon dating, and dendrochronology; C14 is the technique archaeologists use most. Elements like carbon and potassium have different isotopes (same atomic number, different atomic weight). Some of these isotopes are unstable, changing to a more stable form, this "decay" process can take seconds or millions of years, and occurs at a stable rate. If you assess the amount of the isotope and the decayed form remaining now, you can count back to when the object was made. Like relative dating, absolute has its criteria, assumptions and restrictions.		C14 decay chart, examples of a range of objects dated radiometrically
	FP3.E04.gc01	graphic caption	Caption for C14 dating diagram	Unstable elements decay at known, constant rates; they can be used to date artifacts and associated organic material.	Radiocarbon dating is a type of ratiometric dating. Elements like carbon and potassium have different isotopes (same atomic number, different atomic weight). Some of these isotopes are unstable, changing to a more stable form, this "decay" process can take seconds or millions of years, and occurs at a stable rate. The half life is the amount of time it takes for 50% of the volume of an unstable isotope to decay. The half life of C14 is 5,730 years, so it's very useful for dating archaeological objects. Organic objects (made of plants or bone, or leather, or feathers) contain carbon, so a C14 date is considered a direct date for that object. Criteria: You must know the original amount of radioactive carbon present, the amount now present, and the rate of decay. Assumptions: the presumed half life of 5,730 years is correct Restrictions: the atmospheric ratio of C14 to C12 must be constant; the ratio of carbon isotopes in the material must not have changed except by radioactive decay; there should have been a rapid and complete mixing of C14 through the various carbon reserves		diagram of C14 decay
	FP3.E04.fp01	focus panel	Focus panel recounts moccasin dating story		The style and context of the promontory moccasins led to conflicting theories about when and by whom they were made. University of Utah scientist Julian Steward discovered the moccasins in the early 1930s. Steward, a pioneering American archeologists, suggested that the Promontory Cave artifacts indicated that a unique culture was present around the Great Salt Lake between the time of the prehistoric Fremont horticulturalists and the historic Shoshone, but unrelated to either. When carbon dating was carried out on one of these mocs, scientists were surprised to learn that they were much older than originally thought. The unusual puckered-toe moccasins from this site have been radio-carbon dated to between AD 1100 - 1600 AD.	A2538-2558	

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	FP3.E04.ar01	group label	Group label for moccasins				
FP4 Subsistence and Settlement			Visitors see tools used for farming, hunting and gathering, and will learn how ancient peoples used them to acquire, process, and store food. Visitors will see how the different strategies ancient people used in different habitats.				
	FP4.E01.ca01	case	Case with subsistence objects				
	FP4.st01	section title	Title and subhead	To stay alive, ancient peoples needed to get, process, and store food.	This section of the exhibit shows you how ancient peoples made a living, and some of the tools they used. Some were farmers, some were hunters and gatherers, and some did both, depending on the time of year and the resources available. As you look at these ancient objects, imagine what it would be like to make a living in a world without supermarkets, or metal tools.		
	FP4.E01.ms01	mindset	Mindset text describes subsistence in the eastern Great Basin/Colorado Plateau		People don't distribute themselves randomly over the landscape - there are reasons they live where they do. People tend to live near sources of food and water. Optimal Foraging Theory is a set of models that lets archaeologists predict where people might have settled, and how they might have lived in a particular location. For instance, the prey choice model predicts that people will try to find and eat food with the most calories in the least amount of time. Modeling prehistoric behavior also relies on the study of modern societies; we can infer that ancient peoples behaved in similar ways and made similar choices.		map of region showing Mojave, marsh/lacustral, foothills/p-j, montane zones; photos of these zones today
	FP4.E01.fp01	focus panel	Focus panel on Mojave subsistence	Anasazi living in the Mojave were farmers who also used wild resources.	The Mojave Desert extends into southwestern Utah in the St. George Basin. This area is low and dry, with creosote bushes. The growing season is long, and there is little rainfall. The Anasazi people in this region depended on farming (corn, beans, and squash) and hunted deer and mountain sheep. They also gathered cactus, sunflower seeds, cattails, and yucca. They might have roasted agave and prickly pear.		map showing location of vegetation zone; cross section of Great Basin/Colorado plateau showing elevation range
	FP4.E01.ar01	group label	Group label for Mojave farming			corn A2320a-b, 2321, 2322; beans A2348; squash A2349; hoe A2350;	
	FP4.E01.ar02	group label	Group label for Mojave hunting and gathering			A2351-3; A2360, A2359; knife A2358	

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	FP4.E01.ar03	group label	Group label for Mojave food preparation/storage			bowl A2354; olla A2355; mano A2356; metate A2357	
	FP4.E01.fp02	focus panel	Focus panel discusses climate change and coping behavior	When drought kills corn crop, people need to choose how to cope.	There are four coping strategies: moving to a new location, eating and growing different foods, trading for food, and storing food. Kiet Siel in Navajo National Monument was home to farmers who lived in cliff dwellings. In the last half of the 13th century, arroyos were cut into farm land and the water table dropped, followed by the Great Drought of 1276-1299. How did the Kiet Siel people respond? Over time, family living spaces got smaller, and storage spaces got bigger. With food supplies unreliable, people stored food.		
	FP4.E01.fp03	focus panel	Focus panel on Mojave settlement	Anasazi in the Mojave lived near water sources so they could farm.	People lived along rivers, in sites near good farm land. In the Mojave, this means terraces, knolls, or ridges along streams. Some sites have storage structures but no houses, and other sites have houses, but no storage. The Anasazi lived near their fields and made trips farther afield to gather wild resources.		maps showing sites; photos of sites
	FP4.E01.fp04	focus panel	Focus panel on marshes/lacustral subsistence	Marshes and lakes along the edge of the Great Basin were rich sources of plants, fish, shellfish, and birds.	People could make a living year-round in the marshlands. Cattails are especially nutritious, and the starchy rhizomes are a good source of calories. Seeds, pollen, and rhizomes were either roasted or dried and made into cakes or mush. Utah's Great Salt Lake and Utah Lake were major sources of fish, and the marshes and meadows around the lakes provided cattail, reed, bulrush, sedge, sunflower, and prickly pear cactus. Marsh animals like muskrats, otter, beaver, ground squirrel, frogs, and insects were hunted. Small animals were caught in traps and nets. Fish were caught in nets, weirs, and basket traps. Hook and line were also used. Near Bear River, bison grazed on extensive grasslands, and ancient people hunted them, butchering the animals with choppers.		map showing location of vegetation zone; cross section of Great Basin/Colorado plateau showing elevation range
	FP4.E01.ar05	group label	Group label for marshes/grasslands food obtaining, processing, transport			A0588, 0590, 0587, 0530, A2314-19a-d, 2323-31, 2077, 2345, 2344, 2346, 2347	
	FP4.E01.ar06	group label	Group label for lakes and rivers food obtaining, transport and processing			A2332-40, 2342-3	
	FP4.E01.fp05	focus panel	Focus panel on marsh/lake settlement	People living near lakes or in marshes moved frequently, and didn't have permanent settlements.	Fremont people lived along major rivers and creeks. These sites don't have substantial architecture, and food remains are mostly wild resources. Very little corn is found, suggesting that farming was either done elsewhere or rarely done. The people probably lived in shallow pithouses and wickiups. Their lifestyle was semi-mobile as they followed animal migrations or foraged for plants in season.		

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	FP4.E01.fp06	focus panel	Focus panel on foothills/plateau subsistence	The foothills are good for farming, and also rich in wild resources.	In the foothills of the eastern Great Basin and Uinta Basin (4800-6000 feet), the Fremont lived in large farming villages. They gather wild plants like wheatgrass, Mormon tea, wild rye, Indian rice grass, big sagebrush, bitterroot and acorns from Gambel oak. In the summer, they gathered berries. Pine nuts were eaten starting in the Formative Period. The Fremont farmed corn, beans, and squash, and relied heavily on corn. They developed a drought-resistant form of corn "dent maize." Fremont farmers hunted rabbits, elk, mountain sheep, and antelope to get protein.		map showing location of vegetation zone; cross section of Great Basin/Colorado plateau showing elevation range
	FP4.E01.ar07	group label	Group label for foothillls/plateau gathering			A2383, 2088, 2089, 2090, 2091; 2379, 2393a-I, 2394; 2395; 2396; 2440-42	
	FP4.E01.ar08	group label	Group label for foothills/plateau hunting			A2382, 2401-2, 2414-5, 2421, 2424	
	FP4.E01.ar09	group label	Group label for foothills/plateau farming			A2397a-d, 2398, 2400, 2384-88; 2389-92; 1352; 2380-81; 2422-23	
	FP4.E01.ar10	group label	Group label for food preparation and serving			A2399, 2416, 2418; 2425-29; 0634, 0609, 0614	
	FP4.E01.fp07	focus panel	Focus panel for foothill/plateau settlement	It's relatively easy to make a living in the foothills; you can farm in the summer, and gather food in the winter.	Fremont villages were located near water and good farm land. They preferred the sandy soils of alluvial fans. Many sites were occupied year round. The earliest Fremont farming sites were small (1-3 pithouses) farmsteads. The farmsteads were used for a few years, then the farmers moved on to new soil.		
	FP4.E01.fp08	focus panel	Focus panel on montane subsistence	In Utah's mountains , wild plants and animals attracted people to gather and hunt.	Mixed conifer forests grow from 8000 to 10,000 feet in Utah's mountains, interspersed with meadows and marshes. There are also aspen forests, and, above 12,000 feet, tundra. It's hard to live year round in the mountains, but there are medicinal and food plants, such as wild onion and bitterroot, to gather and animals like mountain sheep, elk, and marmot to hunt.		map showing location of vegetation zone; cross section of Great Basin/Colorado plateau showing elevation range
	FP4.E01.ar11	group label	Group label for montane hunting			A2403-13	
	FP4.E01.ar12	group label	Group label for montane gathering			A2419-20; A2443-5	
	FP4.E01.fp09	focus panel	Focus panel on montane settlement	People didn't live in the mountains, but camped to collect resources.	In Utah, mountains higher than 8000 feet were used strictly as hunting and gathering locales. It is thought that Fremont and Ancestral Pueblan period farmers traveled in family groups from the basin and foothills after the harvest and camped where seeds could be collected. In bad crop years, people might have gone to the mountains in summer to pick berries, and hunt animals.		
	FP4.E01.st01	story panel	Story panel; interpretation tbd				
FP5 Technology							

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	FP5.st01	section title	inside case	When they think of technology, most people think of things like computers and space shuttles. But to an archaeologist, technology is anything humans have invented to make a job easier.	In this exhibit area, you will see examples of baskets, pots, sandals, stone tools and weapons, and jewelry made by Utah's ancient peoples. Again, there people didn't have metal, and they formed all these items by hand. Note the craftsmanship, and the details of the decoration. Some items were clearly re-used and repaired.		
FP5.E01 Basketry			A tall case holds baskets and the tools used to make them. Visitors will see the different basket-making techniques and materials used by Great Basin and Colorado Plateau cultures.				
	FP5.E01.ca07	case	Case with artifacts				
	FP5.E01.ms01	mindset	Mindset text explains source materials, use, overview of how made and what made.	Prehistoric peoples made different kinds of baskets for daily use - including mats, baskets, bags, fish traps, and cradleboards.	The term basketry is used to define objects that are manually woven without a frame or a loom. This can include, but is not limited to, baskets, mats, bags, headwear, fish traps, and cradleboards. Baskets are used for storage for food and household goods; they are flexible and portable, and can be made in almost any size. There are three ways used to make a basket in the Colorado Plateau and eastern Great Basin: coiling, twining, and plaiting. All start from the center of the bottom of the basket. (MK, paraphrased) To produce a basket, the weaver must determine in advance the overall shape and size of the desired piece. Next, and at the proper time of year, the weaver must gather the right raw materials. While the inventory of potential raw materials in the Great Basin is relatively large, it has been demonstrated that only a small percentage of available plants was actually used for basketry manufacture in any one subregion of the Great Basin (Adavasio 1986a:203). These ancient basketmakers were probably women	A2052-55	
	FP5.E01.ar01	artifact label	Group label for intro objects				
	FP5.E01.ar02	artifact label	Group label for construction objects			A2057-61, A2099	
	FP5.E01.fp01	focus panel	Focus panel describes twining.	Twining techniques are often employed to create containers, mats, bags, fish traps, cradleboards, hats, and clothing.	Twining is defined by weaving horizontal elements (wefts) around stationary vertical elements (warps). Twining techniques are often employed to create containers, mats, bags, fish traps, cradleboards, hats, and clothing. There are three ways to arrange weft rows and each produces a distinct result. In close twining the rows are so tightly spaced that the warps are completely or almost completely concealed. In open twining the weft rows are spaced at intervals so that the warps are exposed intermittently. Open and close twining is used to conceal and expose warps; usually the intention of this technique is a decorative pattern. (MK w. some paraphrase)		diagrams or illustrations of twining, close and open twining
	FP5.E01.ar03	artifact label	Group label for twined objects			A2062-6	

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	FP5.E01.fp02	focus panel	Focus panel describes coiling.	To make a coiled basket, you lay one coil on top of another, spiraling up, then bind the coils together with lashing or stitching.	There are three types of wall construction in the coiling technique: close coiling, open coiling, and open and close coiling. In close coiling the foundation is bound tightly together by the stitches. In open coiling the foundation is not bound closely together. Open and close coiling incorporates both techniques, usually as a decorative element. Stitches are the active elements in coiled basketry. They may consist of a strip of wood, bark, leaf, or plant fiber. In coiled basketry stitches are described as simple, intricate or wrapping. Intricate stitching is only used with open coiling. The simple stitch can be interlocking, non-interlocking, or split. The slant of the stitch indicates the work direction. Slants that move down to the left(/) indicate a right to left work direction. Stitches that slant down to the right (\ ) indicate a left to right work direction.		coiling illustrations/diagrams; photos or illustrations of different foundations
	FP5.E01.ar04	artifact label	Group label for coiled objects			A2067-76; A2078	
	FP5.E01.fp03	focus panel	Focus panel text describes plaiting.		Plaiting is a subclass of basket weaves in which all elements are active. Strips pass over and under each other at a more or less fixed angle (about 90 degrees). This technique can be used to make a large number of objects including containers, bags, and mats. It is incredibly flexible and the least complex of the weaving structures. There are two types of plaiting: simple and twill. In simple plaiting the weaving elements pass over each other in single intervals forming a checkerboard pattern. In twill plaiting, the weaving elements in one set pass over two or more elements in the other set forming a herringbone pattern.		
	FP5.E01.ar05	artifact label	Group label for plaited objects			A2079-87	
	FP5.E01.st01	story panel	Story panel describes small seed processing		source information tk umnh		
	FP5.E01.ar06	artifact label	Label for Cowboy Cave basket			A0404	
Textiles FP5.E02			Visitors see woven textiles, and the tools and fibers used to make them. They learn how ancient textiles were made, and see a video of contemporary weavers.				
	FP5.E02.ca07	case	Case with artifacts.				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	FP5.E02.ms01	mindset	Mindset text reviews weaving technology and uses.	Ancient peoples wove clothes, blankets, and bags from plant fibers, and yarns made from animal and human hair.	Textiles are flexible or pliable fabrics constructed from spun plant or animal fibers by various weaving, looping, netting, plaiting, or braiding techniques. The fabrics were used for bags, cloths, blankets, and, later, rugs. The record is complete enough that we know what Anasazi Basketmaker people wore, including fringed hip aprons for women, cotton shirts (with and without sleeves), fur and feather robes, and possibly breechcloths for men. Clothing from the Fremont and the earlier Archaic people of the eastern Great Basin has not been well preserved in the archaeological record. Pieces of leather, suggesting hide clothing, and fur robes are all that have survived. Fremont rock art panels suggest that kilts were worn by men; whether these were woven textiles or hide is unknown at this time. (MK w. some paraphrasing)		
	FP5.E02.fp01	focus panel	Focus panel text explains the preparation of fibers.		Bast fibers came from the stem of the plant and were used to make a fine cordage, which was later woven. Ethnographic accounts of leaf preparation may provide clues as to how they were prepared prehistorically. At Acoma and Laguna (Zuni Pueblos) leaves were crushed and the fibers cleaned by scraping. The Cochiti pit roasted the leaves and then chewed them to free the fibers cleaned by scraping and the Tewa boiled and then chewed the leaves. After fibers have been extracted from agave, yucca, etc., they must be spun and twisted into yarn. Two sets of fibers are held together at one end and spun one direction then twisted together in the opposite direction. Heavier yarns are made by increasing the number of single strands by twisting together to or more yarns.		illustrations/diagrams of bast making; photos/illustrations of agave, yucca, other plants; spinning diagrams
	FP5.E02.ar01	artifact label	Group label for fibers			A2108, 2145, 2136, 2138, 2146, 2123, 2430, 2118-22, 2137-40, 2195, 2432, 2109, 2110, 2536	

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	FP5.E02.ar02	artifact label	Group label text describes cotton.		Aboriginal southwestern cotton is known as Gossypium hopii. It was carried, in all probability, in the form of raw fibers and finished textiles up the west coast of Mexico and into the southwest between AD1 and 300. There is no evidence of the cultivation of cotton north of the Hohokom region before AD1100. Somewhere along the line the plant was modified by humans from a perennial to an annual capable of maturing at high elevations and surviving arid conditions without irrigation. The Anasazi probably harvested the plant by picking the unopened bolls and spreading them on rooftops to ripen in the sun. Fiber and seed were then removed and stored in the houses until needed. Before being spun into yarn the cotton had to be ginned (separated from the seeds) and carded (combing or arranging the fibers more or less parallel to one another in loose pads). One way of preparing cotton for spinning was to place the mass of unginned cotton between the folds of a blanket and to beat the blanket with a three pronged switch. The beating loosened seed from fiber and caused the latter to adhere to the surface of the blanket from which it was scraped. The marked preference for cotton is one of the differences that distinguishes Anasazi textiles from those made by the Sinagua, Salado, and probably Hohokom and Mogollon neighbors to the south, who apparently used yucca and apocynum fiber yarns in about equal amounts to cotton fibers.	A2146, 2109, 2110	illustrations/diagrams of ginning, drying; photo/illustration of cotton plant
	FP5.E02.ar03	artifact label	Group label describes plant/fur textiles		Plant fiber yarns generally served as the basis of which fur or feathers might be wrapped to make soft, warm material for blankets and robes. Fur yarn was made by cutting the skin of small animals into narrow strips 1/8" -1/4" wide. One end of the strip, caught between the strands of yucca yarn, was then wound tightly around the yarn as it was being twisted. Turkey feathers wrapped around a fiber string core produced a yarn even softer and lighter than the fur yarn.	A2107, 2129	
	FP5.E02.ar04	artifact label	Group label for yarns		Long sashes were braided by the Anasazi Basketmakers from soft yarns spun from the hair of domestic dogs. Judging from the present record, wool yarns were not commonly used for fabrics other than ornamental sashes or ties. Wool did not come into general use until after the introduction of domestic sheep by the Spaniards in 1540 [date needs to be confirmed]. Human hair was a ready source of fiber; unspun hanks of hair are not uncommon in sites of all prehistoric periods.	A2141, 2089, 2134	
	FP5.E02.ar08	artifact label	Group label for dyes			A2143, 2144, 2147, 2148, 2149	

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	FP5.E02.fp02	focus panel	Focus panel for looped, netted, braided objects.		The most common single-element processes are looping and netting. Looping is when one long yarn is interworked on itself. Netting involves knotting the yarn on itself after a loop has been made. In simple looping a row of loops is fashioned along a stick or cord. Successive rows are added by drawing the free end of the element through one of the loops and crossing it over itself as it moves on to form the next loop. Looping was used to make bags, socks, belts, nets, and possibly hats. Braiding is used to refer to the interlacing of a single set of elements all trending in one direction from a point or line. Elements are not linked, looped, knotted, or wrapped about each other but simply pass over and under their neighbors following an oblique course to the edge of the piece where they turn back on the opposite diagonal. Braiding has been used since Basketmaker times in making sandals, mats, and bands as well as the more flexible string or yarn items known here as textiles.	A2124, 2125, 2150; 2126, 2127	
	FP5.E02.ar09	artifact label	Group label for non-loomed/looping objects			A2150, 2124, 2125, 2127, 2126	
	FP5.E02.ar06	artifact label	Group label for woven objects.			A0213, 2111; plain weave A2131, 2133, 2155;A2132; A2153, 2154, 2152	illustrations of tunic and breechcloth
	FP5.E02.ar07	artifact label	Group label for weaving tools and materials.			combs A1868, 2116, 2117; loom anchors A1876-78, 2112-14; heddle A2115	
	FP5.E02.gc01	graphic caption	Caption text explains weaving on a loom; accompanies artifact display (woven textiles, loom tools).		We do not have the archaeological evidence to pinpoint the exact time when loom weaving began in the Southwest, although it probably followed closely on the heels of the introduction of the cotton plant. The backstrap loom was used for narrow width textiles such as tumplines, skirt and apron bands, cradle bands, belts, and long straps. Horizontal and vertical looms were used for wide textiles such as shirts, kilts, and blankets. It is believed that the vertical and backstrap looms were the basic types used by prehistoric people. In fact, the vertical loom may have even been an Anasazi invention sometime in the PIII period. The vertical yarn, known as the warp, is secured to the loom while the horizontal yarn, known as the weft, is woven in between the warps. The warps are manipulated by a shed rod and one or more heddle rods. The heddle pulls alternate warps so that the weft may easily pass through. The manner in which the weft passes trough the warp dictates the type of weave created.		illustrations/diagrams of weaving on a loom; diagram of loom parts
	FP5.E02.tt01	table top					

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	FP5.E02.in01	interactive	Interactive: weaving and plaiting activities	Woven and plaited objects have many uses.	What you see: tabletop with 6 stations; each has a different activity; examples of prehistoric weaving and basketry (showing different uses from sandals to winnowing baskets) are in the center case, in relationship to the appropriate activity (I.e. sandal proximal to sandal activity) What you do: pick a station, and plait the tethered nylon cords following the diagrams to twine, plait, cordage What you get: the satisfaction of accurately		
	FP5.E02.ap01	activity prompt	Prompts for cordage activities				
	FP5.E02.ap02	activity prompt	Prompts for build a basket activity				
	FP5.E02.ap03	activity prompt	Prompts for weaving activity				
	FP5.E02.av01	av	Weaving and basketmaking AV- Visitors hear the muted rustle of willow, yucca, or rush and watch as a basket maker selects materials for a basket. First the center is formed, then the walls built by coiling, plaiting, or twining. Then, they see a weaver using a backstrap or vertical loom. First the vertical yarn, or warp, is tied to the loom, then horizontal yarn, or weft is added.				
	FP5.E02.at01	av title	Question/grabber		How did they make…		
FP5.E03 Ornament			Visitors will see examples of jewelry, and learn about the precise techniques involved in making beads.				
	FP5.E03.ca04	case	Case with ornaments				
	FP5.E03.ms01	mindset	Mindset text describes the different kinds of ornaments made and materials used, and describes the tool kit.	Using few, simple tools, ancient peoples made an astounding array of precise ornaments	Objects of personal adornment were made from many materials, such as stone, shells, bone, seeds and, to a lesser extent, ceramics and fossils. While styles may have changed over time, the basic technique for manufacturing beads has remained relatively constant. The tool kit to produce most pieces of prehistoric jewelry is rather simple considering the diversity and precision of some of the products. Such a kit would include drills, grinding slabs, files, saws, reamers, engravers, cutting blades, and hammers, though not all would be necessary for producing any given kind of jewelry.	A1330a-b, A2038, 2032, 1879, 2037, A#tk deer phalanges	
	FP5.E03.ar01	artifact label	Group label for intro objects				
	FP5.E03.ar08	artifact label	Group label for effigy pendants			A2024-6	
	FP5.E03.fp01	focus panel	Focus panel describes Paleoarchaic ornament and manufacture		tk UMNH	A0996	
	FP5.E03.ar02	artifact labels	Label for Paleoarchaic ornament			A0996	
	FP5.E03.fp02	focus panel	Focus panel describes Archaic ornament and manufacture		tk UMNH		

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	FP5.E03.ar03	artifact label	Group label for Archaic ornaments			A0379, A2040-2, A0407, A0574, A0991-2,A1038, A1058, A1267, A1390-1, A1504-5, A1525-29, A1547, A1581-89, A1603, A1617, A2533-4, A1629-31, A1635-39, A1641-2, A1644-47, A1925, A2043, A2534-5, A2027	
	FP5.E03.fp03	focus panel	Focus panel describes Fremont ornament and manufacture	Fremont were the masters of bone ornament.			
	FP5.E03.ar04	artifact label	Group label for Fremont ornaments			A1926-86; A2433, A2044; A1978-87; A2045-47; Atk netherstone, Atk abrader	
	FP5.E03.fp05	focus panel	Focus panel describes Ancestral Pueblan ornament and manufacture	Ancestral Pueblans were masters of stone ornament technology.			
	FP5.E03.ar06	artifact label	Group label for Ancestral Pueblan ornament			A1988-2023, 2029, 2033-4, 2036, 2039, 2048, 2104	
FP5.E04 Shoes and Sandals			A table case displays shoes and sandals, allowing visitors to study their details up close. Visitors will see that shoes change over time, and vary regionally.				
	FP5.E04.ca05	case	Table case with artifacts; includes typology example using Anasazi sandals				
	FP5.E04.ms01	mindset	Mindset text gives an overview of footwear technology and use.	Utah's prehistoric peoples made a variety of shoes and sandals; they had practical features as well as stylistic attributes.	Like you, prehistoric peoples wore shoes and sandals (only they made their own). Four styles of moccasins have been found in cave sites north of the Great Salt Lake: the Fremont moccasin, the Hogup moccasin, the hock moccasin and the Promontory moccasin. (MK) Moccasins were made from the hides of animals, and had multiple pieces that were sewn or lashed together. The Ancient Puebloans wove sandals from plant fibers. Sandals had a sole, and variations on toe and heel straps. The dry climate of the Southwest preserved these perishable items, giving us an additional window into how these peoples lived.		
	FP5.E04.ar01	artifact label	Label text describes how Hock moccasins were made and used.		The “hock moccasin” was cut from the hock of an artiodactyl by girdling the leg at two points and removing the hide like a skin tube. The toe was sewn with 2-ply, S-twist sinew and when the foot was placed inside the heel would fit where the hide curved naturally. The moccasin was secured to the foot using a hide strip that was wrapped around the ankle. This style of moccasin from Hogup Cave dates to about AD 420 and between 2950-2050 BC from Danger Cave. (Aikens and Madsen 1986) (MK)	A1805	illustrations/diagrams of Hock moccasins

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	FP5.E04.ar02	artifact label	Label text describes how Hogup moccasins were made and used.		The Hogup moccasins, named after Hogup Cave where they were found, were made with a three piece pattern. The style consists of a single piece of hide that is folded up over the foot and sewn together across the toe, up the center of the instep from the toes to the ankle, and up the back to about mid-ankle. To this footpiece is added an outer sole, sewn flat on the basic piece, and an ankle wrap, sewn around the upper part of the basic pierce giving the moccasin a boot-like appearance. The cross toe seam and the instep seam are strongly puckered. A hide string is attached at the back of the ankle, above the heel, and probably served to lash the ankle wrap around the ankle and lower calf. This style of moccasin was only found in one stratum, which was dated to 650 BC (Aikens 1970) (MK)	A1809	illustrations/diagrams of Hogup moccasins
	FP5.E04.ar03	artifact label	Group label for Fremont moccasins	Fremont moccasins were made from the front legs of deer or antelope.	The Fremont moccasin is made from cut hide from the forelegs of deer or antelope; the hide was girdled just below the knee and above the hoof and cut, leaving a tube. This technique resulted in hobnails made from the animal's dew claws on the sole of the moccasin, usually located at either side of the ball of the foot pointing toward the heel and on either side of the heel or under the instep. Two additional pieces of hide were attached to the sole and sewn together on the top diagonally. The moccasin was held in place with a complex lashing technique around the sides and ankle with a hide tie string. A yellow to reddish cast on some moccasins suggests that some may have been painted (Aikens and Madsen 1986). The Fremont moccasin dates from 650 BC to AD 420, the late Archaic to early Fremont period. (MK w. MKS edits)	A1806-8	illustrations/diagrams of Fremont moccasins
	FP5.E04.ar04	artifact label	Group label text describes how Promontory moccasins were made and used.		In all of the Promontory style moccasins, at least two parts were used: a lower part (A) and a gusset or insert (B). In most cases an upper part is added (C) as well and a few have separate tongues (D). The majority of specimens found at the Promontory site have a lower part constructed from bison hide, although some use deer and antelope hide as well. The gusset is usually of the same material as the lower part, but is of a thinner material. In all but 4 of the specimens the hair has been removed. There were five basic stitches used in sewing together the individual parts of the moccasin. However, the stitching used to attach the gusset was often the most ornamental and of the finest quality.	A1810-15, A1816-18, A1856-60	illustrations/diagrams of Promontory moccasins

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
					On a number of specimens the gusset stitch is adorned with porcupine quill or basketry material. The typical lining consisted of leaving the fur on the inside of the shoe. In addition to, or sometimes in place of, the fur separate pads of cedar bark, grass, or other fur was placed inside. The Promontory moccasins date to approximately AD1250. (MK w. MKS edits)	we have an example of porcupine embellished moc from Promontory and a reproduction pair made for us. These should be exhibited.	
	FP5.E04.ar05	artifact label	Group label for twined and composite sandals		Ancient Pueblo weavers made sandals using three basic weaving techniques:plain weave, twining, and plaiting. Plain weave and twining were done on a simple loom, possibly a belt loom. In twined sandals the wefts work as pairs or triplets and are twisted as they pass over and under the vertical warps; in the most basic of twining techniques the final outcome is very similar in appearance to the plain weave when packed tightly. The warp and weft of the finely-crafted Basketmaker sandals were often made out of finely spun and twisted yucca cordage. Warps for the twining technique were likely set up on a simple, but highly effective, belt loom. (MK w. MKS edits)	A1819, 1820, 1836, 1821, 1822, 1823, 1824, 1864	illustrations or diagrams of twined, composite, plain woven and plaited sandals
	FP5.E04.ar06	artifact label	Group label for plain weave sandals		In most of the Anasazi sandals using a plain weave, the warp (the static element) is tied to itself to create an oval shape. The weft (the active element), usually made of narrow, whole yucca leaves, is then passed over and under the warp, creating a crossing pattern in the center of the sole.	A1825, 1826, 0229, 1828, 1829, 1830	
	FP5.E04.ar07	artifact label	Group label for plaited sandals		Plaiting, on the other hand, was a free-form technique. In the plaiting technique both the warp and weft elements actively cross over one another either in a 1:1 interval (simple plaiting) or in 2:2 or 2:3 intervals (chevron, herringbone, etc.) (MK)	A1831-34	
	FP5.E04.ar08	artifact label	Group label for sandal tools and making		Yarn or cordage was made from yucca leaves after the leaf was broken down into loose fibers by methods that included soaking, pounding, shredding, boiling, freezing, chewing, and scraping. The loose fibers are drawn into a long continues strand by spinning. Spindles came into use about AD 500, but without a spindle, fibers can be rolled against the thigh with one hand while the other lengthens the strand as it is twisted. (MK)	A1874, 1863, 1872, 1862, 1867	

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	FP5.E04.fp01	focus panel	Focus panel text explains Anasazi sandals typology.	If we look at how Ancient Pueblo sandals changed over time, they seem to have become less complicated in design; we might expect the opposite.	The change in style and technique of Ancient Puebloan sandals from Basketmaker II to Pueblo III is a good example of why cultures do not always act according to our own prescribed notions of "progress." The earliest northern Ancient Puebloan sandals are from the Basketmaker II period (AD1-500). These sandals have square heels and toes and were woven in a complex twining and wrapping technique. The most finely woven sandals are from the Basketmaker III Period (AD500-750). In this style the toes are scalloped and the heels are puckered. The sandals have a smooth, ribbed interior surface and sometimes a raised geometric pattern on the sole. Variety of design during this time included two types of weave in a single sandal, one or two types of weave and woven-in color, color painted on the finished surface, and the insertion of extra cords to wrap around the warp and create a raised geometric deign. "During the Pueblo I and Pueblo II periods, sandals were built thick and coarse with rounded or pointed toes using plain weave technique. By the Pueblo III Period sandals trended towards a finer, plaited weave using split leaves. Without the assistance of absolute dating techniques or other diagnostic artifacts (e.g. ceramics), an archaeologist, understandably so, might switch the order of the sandals based on preconceived notions of how technology should have progressed.	A0214, 0218, 0220, 0223, 0222, 0231	
	FP5.E04.ar07	artifact label	Group label for typology artifacts			A0214, 0218, 0220, 0223, 0222, 0231	
FP5.E05 Weapons			Visitors see prehistoric and historic weapons, and learn how they were used and how they work. They will also see how weapons change over time.				
	FP5.E05.ca03	case	Case with artifacts; visitors will see stone points, spears, atlatls, and bows and arrows and will learn how they were made, and about the physics of weaponry. Case includes the Great Basin projectile point sequence.				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	FP5.E05.ms01	mindset	Mindset text explains the evolution of prehistoric weapons.	Weapons were crafted precisely for optimal performance; weapons changed over time to be more efficient, and hunt different kinds of animals.	Prehistoric weapons were precision instruments. Years of experimentation, meticulous craftsmanship, and skill went into their design and manufacture to create the most efficient killing machine. Four prehistoric weapon systems that use stone projectile points are the thrusting spear, the throwing spear, the atlatl/dart, and the bow and arrow. The Clovis point, the oldest known point style, would have been used with a spear. Paleoindians at this time hunted very large animals; when these went extinct at the end of the Ice Age, hunters needed a weapon for hunting smaller, faster game. Thus, hunters abandoned the throwing, and possibly thrusting, spears for the atlatl--a higher velocity, more accurate weapon that could travel longer distances. Bows replaced the atlatl - why? The game animals were the same. Bows shoot the point faster and farther. This shift in technology suggests that the bow duplicated and more successfully carried out the function of the atlatl . (MK w. MKS edits)		photos/illustrations of 4 projectile point "weapon systems"
	FP5.E05.ar01	artifact label	Group label text describes spear morphology and use, materials.		Likely due to their perishable nature, shafts of thrusting and throwing spears have rarely been found in the archaeological record of North America. The oldest spear found so far is from a sinkhole in Florida; the spear was radiocarbon dated to ca. 12,200 BP. The spear was used to kill an extinct species of giant land tortoise, whose shell was found surrounding the spear on a ledge 85 feet below the surface. The Clovis point, as the currently oldest known point style, would have been used with this weapon class. Archaeologists believe the points were hafted to short shafts, which in turn were mounted into sockets on heavier spear shafts. This provided for "reloadable" spears. The Clovis point may have been used with the atlatl. (MK)	A0643-50	photo of oldest spear find
	FP5.E05.ar02	artifact label	Group label text describes atlatl morphology and use, materials.		The word atlatl comes from the Nahuatl language (Uto-Aztecan) meaning spearthrower. Atlatl technology is ancient in the Old World (as early as 20,000 years ago) and probably diffused to the New World along with the first Americans (Justice 2002), although evidence of the first atlatl in North America does not appear until 8000 BP. The atlatl was a spear throwing device, the basics of which are a stick with a handle or finger grip and a hook on the opposite end to engage the end of a dart. A weight can be attached to the board with sinew lashings and the presence of notches on the board of some atlatls suggests either the intention to shift the weight or allot for a variety of stone sizes (i.e., adjust the weight).	A0538, 653, 656-58, 663-6, 673-74, 0687, 0975, 1327, 0676, 0679, 0683, 0678, 0686, 1620	atlatl diagrams or illustrations, rendering of atlatl being used

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
					Atlatl spurs could be carved from the main shaft or made of groundstone or bone and lashed to the main shaft. We think the atlatl was the first weapon in North America that used mechanical principles instead of relying solely on the strength and skill of its user. The dart was usually constructed of hardwood with a stone projectile hafted to its distal end. Early atlatls were unfletched (feathers) but later atlatls incorporated this technique. (MK)		
	FP5.E05.ar03	artifact label	Group label text explains bow and arrow morphology and use, materials.		A bow usually consists of 2 equal, flexible arms, separated by a rigid center grip. The bow is braced by a string that connects the ends of the arms. To make a bow a log was split in half with a wedge. The bark was peeled or scraped off and the bow was shaped with a stone adze. A final shaping was probably completed by scraping. Nocks were sometimes cut into the ends with a stone saw and shaped with an abrader. (paraphrased from MK) A Great Basin arrow consists of a projectile point (stone, glass or metal) inserted into a notch in a hardwood foreshaft and secured with sinew. The foreshaft, in turn, connected to a cane main shaft with fletching (feathers) on the end. The cane was gathered several months in advance to allow time for drying and may have been straightened by heating at the joints and holding in position while it cooled. The cane joints were smoothed with a stone knife and/or abrader. A v-cut was nocked out of the proximal (fletching) end of the arrow to receive the string. Feathers were trimmed and attached to the main shaft with sinew. (Watts 2001) Bow strings most frequently were made of sinew (animal back or leg tendon), rawhide, or gut. Occasionally, plant fibers, such as yucca, nettles, milkweed, and dogbane were used. Well-made plant fiber string is superior to string made of animal fibers because it holds the most weight while resisting stretching and remaining strong in damp conditions. However, plant fiber strings are generally much more labor intensive to make than animal fiber strings, and the preference in the recent past was for sinew, gut, or rawhide. (2007 Iowa State Archaeologist) (edited from MK material)	A0511, 512, 654, 659, 660, 667, 680, 681, 685, 698, 699, 700, 702, 706, 708, 709, 710, 711-40, 1621-25, 1324, 1033, 1632, 1380, 1318, 1415, 1626, 1627, 2098	bow illustration showing parts; arrow illustration
	FP5.E05.ar04	artifact label	Group label for recent bow and arrow objects			A0690, 691, 693-96, 0742, 0743, 0937-40, 1036, 0977	
	FP5.E05.st01	story panel	Story panel: interpretation: warfare in the Southwest			fending stick A1875	
	FP5.E05.fp03	focus panel	Focus panel text explains how the projectile point sequence works and its significance.				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	FP5.E05.ar05	artifact label	Group label for typology points			A1723-5, 2093-4, 1747, 1727-31, 2092, 1733-46, 0243, 2106,	
FP5.E06 Stone Tools			At the lithics case visitors see chipped and ground stone tools, and watch a flint knapper at work on video.				
	FP5.E06.ca03	case	Case with artifacts; visitors see chipped stone tools (points, drills, scrapers, fleshers, and choppers) and the stones they are made from, and learn the how-tos of making and using chipped tools. They also see ground stone tools (manos , metates, abraders, polishers, axes, adzes, mortars and pestles, bead shapers, files, grinding slabs, saws, and stone balls), and learn how these tools were made and used.				
	FP5.E06.ms01	mindset	Mindset text describes lithics technology and use.	Prehistoric peoples chipped and ground stone to make tools; different kinds of stone are used in these processes. Stone tools were often reworked and repurposed.	Lithic technology is a term used to describe the production of stone tools. The word lithic comes from the Greek word lithos, meaning stone. Tools that are flaked are often referred to as chipped stone tools, while those that were ground are referred to as groundstone tools. (MK) Arrowheads, or projectile points, are easy to recognize. Other stone tools are harder to recognize - sometimes they just look like rocks. Ancient peoples used stone to make hammers, choppers, axes, and adzes. These tools were made by grinding or chipping. Ground stone tools often have grooves and scrapes in them. The material ground generally consists of a coarse-grained stone, such as sandstone or basalt, that is abrasive. Chipped stone tools hold an edge better than a ground stone tool, and the edge can be sharpened; chipped stone tools are made from fine-grained rocks. Selecting the right rock was critical.		
	FP5.E06.fp01	focus panel	Focus panel text explains how to make chipped stone tools.		There are two ways to make a chipped stone tool; the first is percussion (striking a stone core with a hard object). Percussion involves the use of a hammer made from antler, wood, or stone. The source stone (core) is given a sharp blow, causing it to fracture in the shape of a cone; this cone shaped fracture represents a Hertzian Cone of Force. This detaches a thin section of stone called a flake. (MKS) Only certain kinds of stone break in a predictable fashion; stones used for "knapping" are largely made of silica and behave like glass when hit with a directed force on a small surface area. In the second way, pressure flaking, pressure is applied to the stone's surface causing chips to flake off. Pressure flaking is usually used to finish of bifacial (flaked on both sides) tools.	A1379, 1386, 1387, 1402, 1406, 1393, 1540	photos of source materials; illustrations/diagrams of tool-making; diagram/illustration of Hertzian cone of force

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	FP5.E06.ar01	artifact label	Group label for process objects			A1379, 1386, 1387, 1402, 1406, 1393, 1540	
	FP5.E06.ar02	artifact label	Group label for drills			A1604, 1574, 1597, 1676	
	FP5.E06.ar03	artifact label	Group label for points			A1358, 1369, 1602, 1605, 1606, 1536-40, 1542, 1543, 1544, 1456, 1571, 1573, 1575-78, 1580, 1608, 1590-92, 1594-6, 1599, 1609-12, 1673-5	
	FP5.E06.ar04	artifact label	Group label for bifaces			A1381, 1382, 1600, 1607, 1598	
	FP5.E06.ar05	artifact label	Group label for choppers			A1384, 1385, 1680	
	FP5.E06.ar06	artifact label	Group label for scrapers			A1410-13, 1416, 1516, 1522, 1524	
	FP5.E06.ar07	artifact label	Group label for reworked points			A1403-4	
	FP5.E06.fp02	focus panel	Focus panel text describes ground stone tools source materials, manufacture, use.		Ground stone tools include manos, metates, abraders, polishers, axes, adzes, mortars and pestles, bead shapers, files, grinding slabs, saws, and stone balls. The first step (as in chipped stone tools) is locating appropriate stone for the final product. Rocks may be found on the landscape or quarried from bedrock formations. Rock size and weight are more important selection criteria for some tools than for others. For example, a metate can be no larger than the rocks available and a mano no wider than the width of the metate. The stones need to be the right texture, and they have to be durable. For example a coarse-grained rock may be chosen for an abrader because it is rough enough to remove material from the surface of another item. A polishing stone, such as those used for ornament manufacture, must be smooth enough to polish rather than abrade and the rock grains need to be well cemented and hard enough to create a surface that polishes without disintegrating into an abrasive powder. (MK with MKS edits)		
	FP5.E06.ar08	artifact label	Group label for abrading, smoothing, and polishing tools			A1378, 1377, 1690, 1685	
	FP5.E06.ar09	artifact label	Group label for grinding and pulverizing tools			A1523, 1396, 1392, 1521, 1388, 1389, 1677, 1678, 1679, 1397, 1398, 1684	
	FP5.E06.ar10	artifact label	Group label for percussion tools			A1409, 1681, 1682, 1683, 1613, 1686, 1687, 1688, 1689	
	FP5.E06.ar11	artifact label	Group label for spinning tools			A2195, 2138	
	FP5.E06.ar12	artifact label	Group label for perforating, cutting, and scraping tools			A1408, 1407	

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	FP5.E06.ar13	artifact label	Group label for miscellaneous objects			A1503, 1338, 1339, 1517, 1515, 1502, 1506, 1508, 1507, 1501, 1500, 1509, 1616, 1127, 1125, 1126, 1400, 1401, 1399, 1615, 1510, 1511, 1514, 1512, 1513, 1405, 1395, 1394, 1614, 1691-1709	
	FP5.E06.av01	av	Stone tools and weaponry AV (with soundscape)		Visitors hear the sharp sound of rock against rock as an expert flint knapper crafts a point by chipping flakes from a stone core.		
	FP5.E06.at	av title	Question/grabber		How did they make…		
	FP5.E06.ar14	artifact label	Group label for Clovis items			A0651, 1379	
FP5.E06.tt01		table top					
	FP5.E06.in01	interactive	Pick your tool matching game; visitors match tools to activities	Like you, ancient peoples used different tools for different uses.	What it is: table top with 3 concentric rings; outer ring has graphics of different activities and the question what tool would you use for? Middle ring has mounted tool (axe, large point, small point, pestle, hammer, bone tool); center ring covers speaker What you do: rotate the center ring to match tool to activity/use (i.e. what tool would you use to grind corn?) What happens: when you line up the right tool to activity, you hear a sound (arrow hissing through air, grinding stone against stone)	Replica points, atlatls, bows and arrows, cordage, balls,	
	FP5.E06.ap01-ap06	activity prompt	Activity prompt for the pick your tool game				
	FP5.E06.gi01-gi06	graphic images	Images of tools in context and being used.				
FP5.E07 Ceramics			Visitors will see how ceramics were made and decorated in a video of a modern artisan using prehistoric techniques. Then, they can compare styles and detail of pot decoration, and be an archaeologist to identify and assemble pot shards.				
	FP5.E07.ca06	case	Case with artifacts; visitors will see pottery shards and vessels, some repaired, and learn the decisions involved in making pottery, as well as its uses. Includes typology display.				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	FP5.E07.ms01	mindset	Mindset text describes pottery making.	Making pottery is complex, and involves knowledge of clays, forming, and firing	Pottery requires expertise in materials, forming, and firing. The process of creating ceramics is a complex one and it is only through expert knowledge of the symbiotic relationship between clay type, construction methods, and firing methods that the potter will be successful. The process begins with collecting the clays and crushing the temper. The vessel is then formed (using construction and then finishing techniques), decorated, and fired. Things don't always go as planned, even for the most experienced of potters and a firing mishap can ruin many hours of what can only be considered a "labor of love." Accidents happened for the prehistoric inhabitants too and pots that have cracked were often repaired by drilling holes on either side of the crack, tying the two pieces together, and filling the holes with pitch. (MK)		
	FP5.E07.fp01	focus panel	Focus panel text explains how to prepare the materials, describes temper.		For low-fired wares (below 800 degrees C) --all prehistoric pottery in North America-- almost any naturally occurring clay can be used, but must be chosen carefully. Natural clay that fires well may not be soft enough to shape. Conversely, clay that is easy to shape (highly plastic) may crack during drying. Most natural clays are very soft or plastic; one of the first discoveries ancient potters made was adding material (temper) to the clay to ensure it dried and fired evenly. Clay is heavy and difficult to transport, so many prehistoric potters probably obtained their clays from sources close to their residences. Typically, the potter would remove coarse particles from the clay, then knead in the temper. The kneading also removes any air bubbles, which can be disastrous during the firing process. (paraphrased from MK)		photos of different types of clay and temper; photo of kneading clay
	FP5.E07.fp02	focus panel	Focus panel text describes how vessels are formed, includes modeling and coiling techniques.		New World potters formed their vessels by hand by modeling, coiling, or molding. Modeling involves shaping a mass of clay into a rough proximity of the desired vessel shape. Sometimes modeling was used just for the base of the vessel, whereby the clay was pressed into a basket and the body built using the coiling technique. The coiling technique involves building the vessel into the desired shape from the base up with long, rope-shaped coils of clay. This is the most common method of construction used in the North American Southwest. The molding technique consists of pressing a flat, circular mass of clay paste into a concave mold or placing it over top of a convex mold.		diagrams/illustrations of shaping and finishing pots
	FP5.E07.ar01	artifact label	Group label for construction objects			A1284-87	

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	FP5.E07.fp03	focus panel	Focus panel text describes how vessels are finished, including polishing scraping techniques.		Vessels were scraped with a stone or pot sherd when they had dried to the ""leather hard"" stage. . The tool leaves parallel scratches on the inside of the pot. Another way to finish a vessel is to polish the surface with a stone. Polishing leaves a soft, lustrous finish (and is very time consuming).		
	FP5.E07.ar04	artifact label	Group label for scraped vessels			A1291-3	
	FP5.E07.ar05	artifact label	Group label for polished objects			A1288-90	
	FP5.E07.fp04	focus panel	Focus panel text describes how vessels are decorated, including incised, applique, punched, biochrome, polychrome and slip techniques.		Prehistoric potters decorated the outside of pots by incising, applique, punching, impressing, and painting. More than one technique can be used on a given pot. Incising involves cutting into the soft clay with a sharp object or a fingernail. Appliqué is applying elements to the vessel, such as the Fremont “coffee bean” design. Impression is when the potter presses another object onto the soft vessel (such as cordage or the back of a fingernail) and painting is when pigments (vegetal or mineral) are applied. (paraphrased from MK)		
	FP5.E07.ar06	artifact label	Group label for punched objects			A1313, 1314, 1375, 1633	
	FP5.E07.ar07	artifact label	Group label for incised objects			A1294, 1295	
	FP5.E07.ar08	artifact label	Group label for impressed objects			A1157, 1309, 1316	
	FP5.E07.ar09	artifact label	Group label for appliqued objects, figurines			A1296-1301, 1306, 1307, 1315, 1634, A1302-04	
	FP5.E07.ar10	artifact label	Group label for pigments and brushes			A2096, 2095, 1519	
	FP5.E07.ar11	artifact label	Group label for bichrome objects			A0607, 0620, 0621, 1305, 1340, 1357, 1346, 1351, 1341, 0624, 0631, 0638, 1354, 1365, 0610, 1649, 0622, 0628, 0629, 0636, 0637, 0640, 0642, 2448, 2449, 2450	
	FP5.E07.ar12	artifact label	Group label for polychrome objects			A1308, 1311, 1312, 1317, 1518, 1360, 1312	

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	FP5.E07.fp05	focus panel	Focus panel describes firing and repair	Ancient peoples used open fires, not kilns to fire their pottery.	Archaeologists assume that most potters in the Great Basin and Colorado Plateau used the open firing technique because only a small number of kilns has ever been found (nine are located in the south-central Mesa Verde area). In fact, very few unequivocal examples of open firing have been found either (5 in the Kayanta Anasazi region and one in the Mesa Verde Anasazi region) [Sullivan 1988; cf. Hurst, personal communication 2007]. Although open firing requires little or no building and maintenance of structures, it requires a high degree of skill. The most critical factor is controlling the rate of firing and the atmosphere. This can be done through choice of fuel, use of insulation, and by careful placement of the fuel and vessels so as to regulate the flow. With all forms of open firing it is virtually impossible to control the atmosphere after firing has begun. Firing mishaps did occur, and pots (as you probably know) can be fragile. We can see on some pots where they have been repaired.		
	FP5.E07.ar14	artifact label	Group label for firing mishap/repair		Archaeologists assume that most potters in the Great Basin and Colorado Plateau used the open firing technique because only a small number of kilns has ever been found (nine are located in the south-central Mesa Verde area). In fact, very few unequivocal examples of open firing have been found either (5 in the Kayanta Anasazi region and one in the Mesa Verde Anasazi region) [Sullivan 1988; cf. Hurst, personal communication 2007]. Although open firing requires little or no building and maintenance of structures, it requires a high degree of skill. The most critical factor is controlling the rate of firing and the atmosphere. This can be done through choice of fuel, use of insulation, and by careful placement of the fuel and vessels so as to regulate the flow. With all forms of open firing it is virtually impossible to control the atmosphere after firing has begun.	A1280, 1281	
	FP5.E07.fp06	focus panel	interpretation story tbd		information tk UMNH		
FP5.E08 Ceramics Typology							

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	FP5.E08.ms01	mindset	Mindset text describes the principles of typology, the surface treatment typology seen in the case.	Archaeologists use typology to create relative sequences of objects.	Archaeologists use typology to create relative sequences of objects. They sort ceramics into typologies based on their technological (clay, temper, etc.), , and stylistic features (cord marking, painting, etc.). That is, the surface characteristics of the pottery sherds (general color, manipulation marks, decoration, etc.) are used to segregate sherds into different categories or types. Types record basic function (serving versus ceremonial wares) and can be associated with specific cultural groups. Because the surface characteristics (like clothing styles) change over time, types are useful for assigning calendar dates to their associated sites, an important consideration when other dating techniques are not available. In this case you will see typologies for Hopi Mesa and Mesa Verde Anasazi. Look at the different colors of clays and decoration, and the types and designs of the decoration.		images of design motifs, diagram of pos showing fields, interior, rim, neck, bottom
	FP5.E08.gi01	graphic image	Timeline rail for typology		dates and events		
	FP5.E08.fp01	focus panel	Focus panel for BIII	These are the first painted pots in the Kayenta region.	AD 600-750 Lino Black-on-white is the first occurrence of paint-decorated pottery in the Kayenta region. Design elements are simple, often duplicating basketry stitch design. Life designs, the walking circle, dots, and simple lines are common. As a rule, designs are restricted to bowl forms and are bottom-oriented or floating. Design fields and their organization are in uncomplicated panels.	A1356	map, style highlight diagram
	FP5.E08.fp02	focus panel	Focus panel for PI	This pottery style is characterized by fine lines.	AD750-900 Kana'a Black-on-white is recognized primarily by its fine lines, which often exhibits overlapping ends and are often in parallel series of 3 to 10 lines. Filler triangles, sometimes with hooks, and ticked and barbed lines are common. Design fields are simple and on bowls they are on the interior and rim rather than being bottom oriented. Bowl and jar rims maybe be painted.	A1342	map, style highlight diagram
	FP5.E08.fp03	focus panel	Focus panel for PII	This style features bold geometric designs.	AD1000-1150 Sosi Black-on-white style is recognized by the presence of solid, bold elongated black lines, often with appended triangular and stepped elements, that cover large portions of the vessel. Bowl exteriors and vessel rims are generally unpainted.	A2446	map, style highlight diagram

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	FP5.E08.fp04	focus panel	Focus panel for PIII		AD1200-1300 Tusayan Black-on-white style exhibits a wide range of design elements, including the introduction of curvilinear design formats. This style has 3 basic layouts: the band, the offset radial composition, and a more complex "multiple Y frame." Band designs with framing lines above and below the band and massive lines framing large design fields consisting of triangles, sawtooths, scrolls and hatching are typical. Offset radial composition is made up of lines of varying width; their arrangement suggests interweaving.	A1348	map, style highlight diagram
	FP5.E08.fp05	focus panel	Focus panel for PIV		AD 1325-1625 (PIV) Jeddito B/Y originates in the Kayenta Anasazi/Hopi region of northern Arizona. It was produced in the Hopi villages, primarily on Antelope and Third Mesas, during the Pueblo IV period. Bowls are highly polished on both surfaces and no slip or wash was applied. Paint was almost exclusively mineral-based. Decoration varies greatly in skill of execution of designs. Bowl interiors and jar exteriors were always decorated; bowl exteriors decorated more often in later periods with isolated, asymmetrical designs or figures; and jar interiors were sometimes painted on interior of flared lip and, rarely, spattered inside. Some vessels exhibit stippling and/or engraving. Vessels exhibit tight geometrical designs early on, which opened up during transitions in later types.	A1804	map, style highlight diagram
	FP5.E08.fp06	focus panel	Focus panel for San Bernardo Polychrome	The influence of Franciscan missions in the Hopi area resulted in new pottery forms imitating European ceramics.	AD1625-1740 The influence of Franciscan missions in the Hopi area resulted in new pottery forms imitating European ceramics, new fuel used in firing (dung) new designs, and new values associated with pottery (i.e., an increasing secularization of ceramics and discouragement of ceremonial use). Of paramount importance was the Pueblo revolt of 1680 and the wave of immigrants into Hopi country, which had a profound affect on the course of Puebloan ceramics. Vessel shapes and functions are heavily influenced by the Spanish and later in the 17th century by the Tewa, particularly in the plain wares. Although some painted jars show a distinct Tewa influence (geometric patterns dominate), many of the decorated wares maintain the design tradition of the Sikyatki Polychrome. One change from the former tradition is that Mission period Sikyatki-style bowls have red rims (usually in conjunction with black ticking) whereas the earlier period vessels had undecorated rims	A2456	map, style highlight diagram

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	FP5.E08.fp11	focus panel	Focus panel for Payupki Polychrome	Keresan refugees influenced Hopi potters.	AD1680-1780 A major new pottery type arose during the troubled years of the Pueblo Revolt when the Hopi were hosts to large numbers of refugee Rio Grande Puebloans (Keresan speakers), such as the Zia. The design motif used on Hopi vessels is markedly Keresan in style. Feather motifs abound and there is an overall emphasis on painted versus negative design. The composition is dominated by heavy geometric forms painted in primary black and red. There is a particular interest in paneled layouts.	A2457	
	FP5.E08.fp07	focus panel	Focus panel for Pollaca Polychrome - Early	This time marks a transitional period in Hopi ceramics-a time of experimentation with new shapes and designs.	1820-1860 This time marks a transitional period in Hopi ceramics-a time of experimentation with new shapes and designs. Keresan influence remains but is less influential than the Zuni forms and motifs. Realistic floral and animal motifs, as well as lacy curvilinear decorative elements to embellish and frame the primary composition, are adopted from the Spanish from a decidedly Hopi perspective. Some Hopi pots are replicas of Zuni pots, suggesting intermarriage between the two Puebloan groups. This variant separate neck designs are the norm and there is a tendency to contrast the neck design with that of the body, such as a geometric body composition with animal or plant designs on the neck. The most common body design is a zonal layout broken into four panels-typically the large panels share a similar design as do the small panels. Jar rims are typically painted red until ca. 1850 when rims color changes to black.	A0604	map, style highlight diagram
	FP5.E08.fp08	focus panel	Focus panel for Pollaca Polychrome - Late	During the 1860s drought forced the Hopi to migrate to the Zuni Pueblo, which heavily influenced the design of Hopi pottery.	Zuni Modified Variant 1860-1890 The adaptation of katsina costumes and masks into secular pottery designs is a Hopi invention. Although not new to this period it became a favorite subject. There is good inferential evidence that the commercialization of Hopi pottery began at this time, sometime in the 1880s. Design layouts for the Zuni Modified Variant designs were placed as if on a flat canvas with minimal concern for the negative forms created by their juxtapositions. With the exception of an arabesque style common to stew bowls most other compositions during this time are less complex than those during the previous two Polacca variants. Simple zonal layouts for jars and bowls increase significantly. Katsinas, birds, and floral motifs on bowls grow in popularity-breaking with the geometric orientation of the earlier variants.	A0972	map, style highlight diagram

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	FP5.E08.fp09	focus panel	Focus Panel for Early Sityatki Revival	Sityatki polychrome is one of the most exquisite pottery styles.	AD1375-1625 New decorative motifs as well as stylistic changes appear during this period. Potters experimented with splattering, stipple and drybrush for the first time. The very formal, precise angular compositions are replaced by sweeping curvilinear designs. A profusion of naturalistic and abstract animal and plant motifs are used, especially abstracted birds and bird parts. Sityatki Polychrome uses black and red mineral paint on yellow ware.	A0974, A2447	map, style highlight diagram
	FP5.E08.fp10	focus panel	Focus panel for Hano Polychrome	Nampeyo revived older styles of Hopi pottery, starting the modern Hopi pottery tradition.	1890-1942? The beginning of the Hano Polychrome ceramic tradition is attributed to the Hopi-Tewa potter Nampeyo. Although she had likely been trading her pottery at trading posts since she was a young woman, the decade of the 1880s saw Nampeyo reach her full flower because it was during this time that Nampeyo abandoned the Zuni-like pottery, common within the Mesas. Nampeyo and her husband had visited the nearby prehistoric ruins, where Nampeyo saw the sherds of the beautiful pottery made three centuries previously. She discovered the clay and how to form and paint it. She also began to adapt the beautiful motifs to use in her own pottery. Nampeyo is given credit for starting the revival of Hopi pottery, the so-called “Sikyatki Revival.” She was influenced by designs from not only prehistoric and historic Hopi, but cultures other than Hopi. In a sense, she revived Hopi pottery; but since her work and pottery of today differ greatly from that of the Sikyatki periods, she is credited with the birth of contemporary Hopi pottery, now called Hano Polychrome.		map, style highlight diagram
	FP5.E08.st01	story panel	Story panel: Hopi potter discusses influence of older pottery styles, pottery traditions				
FP5.E08.tt01		table top					
	FP5.E08.in01	interactive	Ceramics interactive: decorate a pot, piece together a pot	The patterns you make reflect your individual preferences, and your culture.	What you see: a tabletop with 4 replica pots in the center; 2 stations with blank pot graphics and tethered decorating tools, 2 stations with a partial pot on an armature on the perimeter What you do: decorating: pick a station, and use the stamps and tools to decorate the pot graphic; you might choose to copy the pot in the center, or develop your own design; cues encourage you to look at the center pots - where are the different design elements? what are they?; piecing together: look carefully at the pot sherds in the bin - which might fit the gaps in the pot? try to see if you can put the pot back together What you get: artistic satisfaction, satisfaction of completing a pot	shells, obsidian, flints	
	FP5.E08.ap01-ap04	activity prompt	Prompts for ceramics activities.				
	FP5.E08.gi01-gi04	graphic image	Images showing processes of formation and decoration of ceramics				
	FP5.E08.av01	av	Ceramics and weaving AV		The ceramics video shows potters making pots using coiling, molding, and modeling, then finishing them. Some pots are decorated with incised, punched or painted designs before firing.		

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	FP5.E08.at01	av title	Question/grabber		How did they make…		
FP6 Trade			Visitors will see objects traded, their sources, and the material they are made from. Accompanying labels will explain the three steps archaeologists use to source the objects and determine if they were traded.				
	FP6.E01.ca02	case	Case with artifacts; visitors will see source materials (obsidian, coral, turquoise, shell) and objects traded, and will learn why archaeologist think trade occurred. Using maps and how-to pointers, visitors will see the steps of describing exchange: sourcing, plot the relationship between source and terminal, and interpretation. A sourcing hands on activity walks them through this process.				
	FP6.E01.ms01	mindset	Mindset text reviews trade and how it's interpreted.	Ancient peoples exchanged goods through trade, gift-giving, and tribute. Archaeologists analyze the source of the item and maps its journey, then interpret how the exchange was organized.	(Sharer and Ashmore 1993, Renfrew and Bahn 1996, Ericson and Earle 1982) An exchange system is one of several methods by which humans acquire goods and services not normally available to them locally. Exchange includes trade, gift giving, tribute, and any other means of moving objects from one person or group to another. A common distinction is drawn between local and long-distance exchange. To describe exchange, the archaeologist has three interrelated tasks: (1) to source the commodities of exchange, (2) to plot the relationship between the source and the terminal, and (3) to reconstruct or interpret the organization of the prehistoric exchange.		
	FP6.E01.gc01	graphic caption	Caption text explains plotting sourced goods.		The ability to identify the point of origin of a raw material or object is essential to establish the presence and/or extent of prehistoric exchange. The most common techniques use other scientific disciplines, such as biology and geology, to establish an unequivocal source determination. After the sources of artifacts have been identified, several approaches may be used to describe the spatial patterning in the materials and to suggest the possible exchange mechanisms operating prehistorically. Two common approaches are regional point scatters and regression analysis.		point scatters, regression analysis
	FP6.E01.ar01	artifact label	Group label for species analysis		One way to determine the source of an artifact is inherent in the object itself. Analysis of an object that came from something living (such as a shell pendant) may be identifiable to genus or species. Taxonomic identification is very useful in determining the known habitational extent and, thus, the source of an organism.	A1328, 1418, 2156-58, 2196, 2161-62, 2164-71, 2159-60, 2245	

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	FP6.E01.ar02	artifact label	Group label for thin section analysis		The material from which an artifact is made is a far better guide than its style (which can be copied) to determine the place of origin. Whole exchange systems can be reconstructed, or at least the movement of goods can be investigated, if the materials in question are sufficiently distinctive for their sources to be identified. Since the middle of the last century techniques have existed for cutting a thin section of a sample taken from a stone object or potsherd to determine the source of the material. It is made thin enough to transmit light and then, by means of petrological examination with a light microscope it is usually possible to recognize specific minerals that may be characteristic of a specific source.	ceramic A2163, 2172 stone A2198, 2200-04, 2206-10, 2173, 2198, 2212, 2213	
	FP6.E01.ar03	artifact label	Group label for XRF analysis		In X-ray fluorescence (XRF) spectrometry, the specimen is bombarded with X-rays or high-energy electrons. The resultant spectra lines or peaks are characteristic of the elements present in the specimen. The height of the peaks is directly proportional to the amount of each element - these are converted to quantitative parts per million figures by comparing them with rock standards of known chemical composition. (http://www.obsidianlab.com/faq.html#xrf_how) XRF is most often used for sourcing obsidian and other fine-grained, volcanic rock. Years of XRF sourcing of obsidian from Fremont sites indicate that obsidian sources most exploited by the Fremont were from volcanic sources in western Utah and in Malad, Idaho.		
	FP6.E01.gc02	graphic caption	Graphic captions explain reconstructing trade patterns.				diagrams of different kinds of trade
	FP6.E01.ar04	artifact label	Group label for Fremont trading objects			A1325, 2174-79, 2181-93, 2197, A2762	
	FP6.E01.ar05	artifact label	Group label for Fremont game pieces			A2184-91	

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	FP6.E01.fp01	focus panel	Focus panel discusses Baker Village and central place exchange	Baker Village, in Nevada, was apparently a settlement where Fremont traded with peoples from east and west.	There is very little evidence for market places in Utah's prehistory. However, some archaeologists think that some of the larger villages were used as central places for exchange during certain times of the year, especially during festivals. For historic Native Americans, trade fairs or festivals were important mechanisms for intervillage and long distance exchange in the Southwest. Baker Village is a Fremont habitation site located on the western edge of Snake Valley in Nevada and is the western-most Fremont farming village site known to date. The Baker Village occupants appear to have had well established relations with peoples to the east and west. Materials obtained from the east, where ties appear to have been the strongest, include trilobite fossils and crinoids, obsidian, and Fremont ceramics. Evidence of connections to the west consists primarily of marine shell and possibly turquoise.		map of Baker village and trade routes; photo of site
	FP6.E01.ar03	artifact label	Group label for Baker Village items			pendants A2214-17; shell beads A2218-23; trilobite pendant A2224, pot sherds A2225-7, obsidian A2228-9	
FP7 Range Creek/ Current Research			Visitors will see objects and artifacts from Range Creek, and learn about current archaeological research at the University of Utah. The initial exhibition will contain materials related to the story of environmental and fire regime changes in Range Creek over time. These exhibits are flexible, and will change providing an ongoing window into the work of the University and the museum.				
	FP7.si01	section intro			This exhibit area features the University's and the Museum's work at Range Creek -a canyon in which hundreds of spectacularly undisturbed archaeological sites preserve evidence of the Fremont cultural complex. Range Creek is unique - it was on privately owned land until 2001, and almost undisturbed. Now, a multidisciplinary team of scientists is studying Range Creek and its sites. You'll learn about some of the latest insights, and see artifacts from this remarkable canyon.		
	FP7.E01.pm01	photomural	Range Creek photomural				
	FP7.E01.gc01	graphic caption	Caption for photomural				
	FP7.E01.ca08	case	Case displays objects and artifacts that illuminate the interdisciplinary work underway at Range Creek relating to paleo-environment and changing fire regimes in the area.				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	FP7.E01.ms01	mindset panel	Mindset panel describes Uof U, UMNH interdisciplinary research at Range Creek	Many different scientists and fields of study work to piece together the story of Range Creek, a spectacular site in northeast Utah.	The Range Creek Archaeological Project is part of a large, multi-year project designed to identify and document archaeological sites in a spectacular, remote desert canyon near Price, Utah. Range Creek is a tributary of the Green River, and is similar to nearby Ninemile Canyon. It contains hundreds of Fremont archaeological sites including adobe and masonry granaries, pithouse villages, caches and cists in rockshelters, and amazing rock art panels. An interdisciplinary group of scientists from the University of Utah and sister institutions are studying Range Creek. This work includes site identification and analysis, study of plant remains to shed light on past climates, and zooarchaeologists are identifying the animal bones. Approximately 145 archaeological sites were identified and recorded during the 2002 and 2003 field seasons. Hundreds of Fremont archaeological sites that have not yet been recorded include adobe and masonry granaries, pithouse villages, caches and cists in rockshelters, and amazing rock art panels.		
	FP7.E01.fp01	focus panel	Focus panel describes environmental reconstruction at Range Creek.	Shifts in effective moisture creates changes in plant communities. Their fossil remains provide a window into changing climate at Range Creek.	Dendroclimatology uses the sametree rings as dendrochronology but looks at the variation in the rings as a consequence of environmental changes across time. Wider rings indicate a year with favorable growth conditions (plenty of water and a long frost-free season); very narrow rings, the opposite. A black smudge is evidence of a fire. Examination of the rings creates a picture of how the climate has changed. Core samples show changes in pollen types and frequencies over time (as determined by radiocarbon dating and the presence of volcanic ash falls), allowing paleoecologists to reconstruct transformations in regional vegetation.	artifacts? Where does tobacco bundle A1789 fit in?	

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
					Cut bank studies focus on the alluvia (sediments) that are exposed when the water level of an area drops and exposes the bank. These are similar to the studies of core samples, but the cut banks allow scientists to examine broad expanses of the alluvium, facilitating the study of fluvial hydraulics, pollen, and fire history of Range Creek. These people lived here a thousand years ago and they were impacted by climate and water, and they dealt with these climatic changes. There are opportunities for us to apply those lessons today.		
	FP7.E01.st01	story panel	Story panel: Andrea Brunelle				
	FP7.E01.ar01	artifact label	Group label text describes corn farming and use at Range Creek		Visitors can make correlations between corn in the landscape (corn cobs and granaries), corn pollen in the core, and corn seeds in the midden. Along with digging stick and mano/metate, a full picture of corn and its use is created.		
	FP7.E01.gc02	graphic caption	Caption text explains the movement of plants within elevational gradients.	Visitors learn about the movement of plants within elevational gradients as effective water changes with climate change.		A1784-88	
	FP7.E01.ar02	artifact label	Group label explains the evidence from charcoal		Charcoal recovered in both pack rat middens and soil cores reveals the nature of fire over time in Range Creek. Fire is both a natural-occurring and human-set phenomena. Following the departure of Fremont people in Range Creek, an enormous increase in charcoal signifies a major change in fire frequency. Two scenarios could explain this shift:1. The Fremont may have burned to maintain the land while occupying the area, keeping the fuel load low. Upon their departure, increased fuel load led to major wild fires. 2. Alternately, Ute people occupying the area after the Fremont may have practiced slash and burn cultivation to raise tobacco.	A1782, 1783	Photographs of various indigenous fire management approaches—why and how people burn (Jim O'Connell photos, other slash and burn photos, and wild fires at Range Creek. Graph with embedded micrographs of charcoal illustrates fire frequency in Range Creek during Fremont and post-Fremont periods.
	FP7.E01.fp02	focus panel	Focus panel text explains dendrochronology	Tree ring dating is a very useful absolute dating technique in the Southwest.	Tree-ring dating involves cutting cross-sections of tree trunks, like slicing bread, and then counting the number of rings from the bark-side inward to determine the exact age of the tree. This method is very precise temporally, allowing archaeologists to date the year a piece of timber was cut. Also known as dendrochronology,tree-ring dating is based on variations in thickness of annual growth rings, which reflect variations in the climate during the lifetime of a tree. Over relatively long periods of time (about 30 years), this pattern of tree-ring thickness variation is unique and allows the matching of prehistoric samples with a master sequence (those from a known cutting date).	tree core tk	
FP7.E01.tt01		table top					

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	FP7.E01.in01	interactive	Interactive: pack rat midden Microscope and slides to view core and midden materials: grass, corn, corn pollen, charcoal, other diagnostic plant pollens	Pack rat middens preserve a record of past ecosystems.	What you see: tabletop with central case holding packrat midden; perimeter ring with inset magnifiers What you do: move around the table to the different magnifier stations and see the evidence in the midden (grass, corn, corn pollen, charcoal, other plants); adjacent to each magnifier is a caption explaining what that piece of evidence tells us What you get: a close look		
	FP7.E01.ap01-ap05	activity prompt	Prompt for midden activity		caption for photomural		
	FP7.E01.gi01-gi05	graphic image	Graphics of pack rat midden elements				
	FP7.E01.qt01	quote/question	Quote/question on east wall near Range Creek exhibit				
FP 8 Rock Art			Visitors see a photomural of 9 Mile Canyon. On an adjacent magnet board, they can match petroglyph styles to regions of Utah, and compose their own rock art walls with words and graphics.				
	FP8.E01.ic01	inset case	objects related to rock art iconography and first people ideology			a1616, a3086, a3087, a3088, a3089, a3090, a3091, a3092, a3093, a3094, a3095, a3096	
	FP8.E01.ar01	artifact					
	FP8.E01.ms01	mindset	Mindset text explains different types of rock art and "styles"; discusses what we can and can't know about rock art, the cultures, and the artists.	While we can't know the significance or meaning of rock art, it offers tantalizing clues to ancient life.	The term "rock art" refers to images rendered on immovable natural rock surfaces, such as bluff faces, cave walls, and large boulders. Painted images are called pictographs. Pecked, carved or incised images are petroglyphs. Occasionally these techniques were combined to produce painted petroglyphs. The Southwest region of the United States has the greatest concentration of rock art in the Americas. The oldest rock art in Utah with a known date is an incised pebble from an 8,700 year old level in Cowboy Cave. Survival of ancient paintings is attributable to use of mineral pigments, most commonly manganese, hematite, malachite, gypsum, limonite, clays and various oxides. The best preserved pictography is found under sheltering overhangs and in caves.		

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
					Archaeologists study rock art to learn about 1) technology and technique, 2) regional styles (By identifying rock art styles and analyzing their distribution, we can help assess style zones based on other classes of materials.) 3) dating (Establishing the age of individual rock art elements and regional style complexes have been notoriously difficult, and one reason many archeologists have neglected rock art in the past. Sometimes we can place individual rock art motifs at a single site into relative order, if the images are superimposed, or if images on the same rock face display different degrees of weathering. Some images illustrate ""datable"" subject matter (i.e., mastodons must be Paleoindian; horses or firearms must be historic).) and 4) why it was made/what it symbolizes (While much of this has to be speculation, oral traditions of modern Native American cultures often shed light on the meaning of rock art). mostly from What is rock art and what can it tell us about the past? By George Sabo III and Deborah Sabo Arkansas Archeological Survey		
	FP8.E01.gi01	graphic image	Map of sites in Utah where rock art can be found		caption: names of sites, how to visit responsibly • Enjoy rock art by viewing, sketching, and photographing it. NEVER chalk, trace, or otherwise touch rock art. Any kind of direct contact causes these ancient figures to disintegrate. • Creating modern "rock art" is known as vandalism and is punishable by law.		
	FP8.E01.gc01	graphic caption	Caption text describes 9 Mile Canyon and its rock art.		Called "the longest art gallery in the world,", Nine Mile Canyon in central Utah has international, national and local significance due to its extraordinarily high concentration of prehistoric rock art, including petroglyphs and pictographs made by the Fremont and Ute Indian cultures. More than 10,000 rock art images exist in Nine Mile Canyon, and although only a small portion of the canyon has been systematically surveyed for cultural resources, at least 830 prehistoric sites have been formally recorded. Thousands of years ago, Native Americans from the Ute and Fremont tribes carved 10,000 images of people and animals in the walls of a Utah gorge now known as Nine Mile Canyon.		
	FP8.E01.in01	interactive	Magnetic board with rock art symbols				
	FP8.E01.gi02	graphic image	rock art symbols				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	FP8.E01.ap01	activity prompt	Prompts for rock art activity	Compose your own rock art! What story do you want to tell?	America's first artists left paintings and carvings on rock surfaces, perhaps as early as 10,000 years ago. These prehistoric images, known as rock art, have been found in 41 of the 50 states, as well as in Canada and Mexico. Some of the rock art images are maps showing routes to hunting areas, gathering areas, water sources or just the best way to cross the mountains. Many of the panels are calendars, these are designed to work with light and shadows on certain dates, such as solstice, equinox or cross quarter days. These calendars may have marked the days for ceremonies; or simply let people know which days were best for planting corn and beans. Other panels tell stories; some religious or ceremonial panels. These are often shamanistic and contain "ghost" or "spirit figures". Compose your story using the		
FP9 Great Basin/ Colorado Plateau Cultures			Introductory text describes the region's cultures and locates them in space and time; images of key artifacts, sites, and structures from each culture are displayed with maps and timelines.				
	FP9.E01.ms01	mindset	Mindset text introduces the region's cultures.	In this region, archaeologists distinguish Paleo-Archaic, Archaic, and Formative" complexes." These peoples lived at different times, and in different parts of the state.	Utah's prehistory is as diverse as its scenic topography, covering a period of more than 11,000 years. Archaeological sites have been identified in all corners of the state illustrating the ancient people of Utah were able to adapt to deserts, high mountains, badlands, and marshes. The first people living in Utah are called the Paleo-Archaic. At about 8000 years ago, changes in weaponry styles and subsistence patterns mark the beginning of the Archaic period. During the Archaic, people were hunters and gatherers, and nomadic but they also lived in semi-permanent small villages and caves. During the Archaic (8000-2500 years ago), people made a variety of basketry for plant collecting and various stone spear and dart tips used in hunting. In the Formative Period (AD500-1300), people relied on corn farming, and their lifestyles became increasingly sedentary. These people made pottery, and used bows and arrows to hunt.		image of artifacts in gallery
	FP9.E01.fp01	focus panel	Focus panel text describes Paleo-Archaic, where they lived, and how they lived.	The first settlers in Utah were Paleo-Archaic people who moved often in search of resources to hunt and gather.	Paleo-Archaic people in Utah experienced a very different climate than today; it was the end of the last Ice Age, and climates were colder and changed rapidly. These early Utah settlers hunted the megafauna (mammoths, mastodons, bison) as well as smaller game; they also fished. Paleoarchaic people moved among base camps that may have been occupied for weeks at a time; they may have used rockshelters or caves. The fluted point is the characteristic Paleo-Archaic technology. It was attached to a thrusting spear, or perhaps an atlatl.		image of artifacts in gallery, map showing where they lived, notable sites

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	FP9.E01.fp02	focus panel	Focus panel text describes early Archaic people, where they lived, and how they lived.	Early Archaic sites are known from caves on the perimeter of Great Salt Lake; these people used the rich marsh and wetland resources to survive.	7000BC-5000BC The temperatures at the start of this phase were cold, then became warmer than today. Pine forest grew at lower elevations than today. In the Great Basin, early Archaic sites are almost always in marshes; people lived in caves and rock shelters near freshwater springs around Great Salt Lake. As the megafauna died out, people began eating seeds. Seeds need to be processed, by roasting or milling. The early Archaic people hunted with atlatl, and gathered cattail, bulrush, prickly pear cactus, and pickleweed. Some of these were eaten, others used to make mats, baskets, and other woven objects. People were still nomadic, but beginning to stay longer in one place.		image of artifacts in gallery, map showing where they lived, notable sites
	FP9.E01.fp03	focus panel	Focus panel text describes middle Archaic people, where they lived, and how they lived.	Middle Archaic people had a seasonal round of movement between upland and lowland; they used a variety of resources in these places.	6000-2000BC During this time, temperatures rose, and there were fewer sources of water, until the Neoglacial at 2500 BC, when temperatures cooled and the climate became wetter. Utah Lake formed after 5000 BC and was an important prehistoric fishery. In this period, people increasingly used upland resources, and spent less time in the dwindling marshes. They moved seasonally between uplands and lowlands, staying for short times to do specific tasks (hide preparation, seed processing). Many of the upland sites were hunting camps, and roots and grasses were also collected.		image of artifacts in gallery, map showing where they lived, notable sites
	FP9.E01.fp04	focus panel	Focus panel text describes late Archaic people, where they lived, and how they lived.	At this time, corn appears in Utah, and people became settled farmers.	1000 BC-AD500 This time period was cool. Many people lived in lowland villages; there were surrounding scattered populations of high desert foragers. Villages were occupied for at least part of a year. Rock shelters were used long-term seasonally; caves were used for camping; temporary brush structures were used for storage. Later, the people built slab-lined pit houses on Cedar Mesa. Farming sites include upland dry farming and floodplain farming. The earliest samples of maize in Utah date to 200B.C. and AD400. The shift to farming was part of a pattern of staying in one place, an increase in food storage, and more permanent architecture. The atlatl was the weapon of choice. On the northern Colorado Plateau, the people were highly skilled weavers.		image of artifacts in gallery, map showing where they lived, notable sites

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	FP9.E01.fp05	focus panel	focus panel text describes Formative people, where they lived, and how they lived	Formative people began to live in large villages; they traded, and build large structures cooperatively.	In this period, corn farming became widespread, and pottery and bow and arrow technology appeared. The Fremont culture were farmers, hunters, and foragers, depending on where they lived. Although their lifestyles varied, they all made rod-and-bundle baskets, and distinctive moccasins and figurines, as well as polished stone balls and thin-walled plain gray pottery. Toward the end of this period, the Fremont built adobe and pit houses, and multi-room granaries and other storage structures. The Fremont complex began to disappear after AD1250, perhaps because the climate was too dry to grow corn. The Ancestral Puebloans (you might recognize them as "Anasazi"), lived in Utah at the same time as the Fremont, from AD500-AD1300. These people made black on white pottery, grew corn, hunted and gathered, and later in this period, settled in villages with pithouses. Some of the pit houses were large, and may have had community social uses. Later structures were built of jacal or adobe, and farming became complex, with terracing and irrigation in use. Still later, the people lived in stone houses. Their villages were laid out like those of Mexican cultures, suggesting contact with those people. At the end of this period, the people lived in large villages; the larger villages included monumental structures, plazas, and great kivas. This is the age of cliff dwellings like Canyon de Chelly. Around AD1200-1250, the people moved south from the Mesa Verde and Kayenta areas, due to a mix of push (warfare, climate variations that affected farming, collapses in trade systems) and pull (better farm lands, more rainfall) factors.		image of artifacts in gallery, map showing where they lived, notable sites, photos of large cliff houses and structures

LAND

1. Utah's landscape exhibits deep time. It reveals rock from every geologic time period.
2. Plate tectonics and erosion are major shapers of the landscape.
3. Studying rocks, life, soil, tectonics, and regimes tell us about the qualities of the three provinces of Utah.
4. Human interactions are speeding rates of change.

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
LD1 Introduction			There are two introductory panels to introduce the Land Observatory. One is located at the top of the ramp as visitors enter from Life; it is a large rock slab with the name of the Observatory etched into the face and a relief map of Utah's provinces. The second introductory panel is for visitors entering from First Peoples and describes how Utah's landscapes are a 3D textbook of geology.				
LD1.E01.ip01	LD1.E01.ip01	Intro panel	Title, quote, intro text	Utah has three unique and extreme landscapes (physiographic regions); the landform in each are very different.	This exhibition explores the origin and evolution of Utah's three major physiographic regions: the Middle Rocky Mountains, the Colorado Plateau, and the Basin and Range. Middle Rocky Mountains are part of the Rocky Mountains and encompass the NE section of the Utah. The Colorado Plateau is found in the SE part of the state; these are the spectacular canyonlands. The Great Basin, a series of mountain ranges and valleys, forms the entire western half of Utah.		
	LD1.E01.gi01	graphic image	map of Utah showing physiographic regions				
	LD1.E01.gc01	graphic captions	Captions for map				
LD1.E01.ip02	LD1.E01.ip02	Intro panel	Title, quote, intro text	Utah's landscapes are a living geology textbook. Almost any drive you take along Utah's highways is a drive through time	Whether you drive east or west, north or south, you will find Utah's geologic record exposed along the highway. College classes from all over the country come here to see for themselves the results of geologic processes like mountain building, erosion, uplift, and glaciation. Utah's landscapes record the presence of past life, from trilobites to dinosaurs to people in fossil quarries, archaeologic sites, and rock art localities. If you visit, remember to leave the sites as you found them for others to enjoy.	highway 6 rocks and fossils	
	LD1.E01.gi02	graphic image	Road map of Utah				
	LD1.E0.ic01-06	inset cases	Cases in drive through time hold artifacts and rocks				
	LD1.E01.gi03-gi08	graphic images	Contextual images of artifact and rock origins				
	LD1.E01.ar01-06	artifact label	Labels for rocks and fossils				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
LD1.E02 Utah Through Time			As visitors make their way down the first ramp exhibits show 7 periods in Utah's geologic Past with current "you are here" marker to facilitate the visitor's understanding of the map. The time periods are: 1. Pre-Cambrian (550 mya), 2. Late Cambrian (500 mya), 3. Late Pennsylvania (300mya), 4. Early Jurassic (195 mya), 5. Late Cretaceous (75 mya), 6. Early tertiary (60 mya) 7. Late tertiary (15 mya) 8. Quaternary (126 mya)				
	LD1.E02.gi01	graphic image	Visitors see a map of the Western United States during the Pre-Cambrian era. "You are here" marks the current location of the museum on the map.	Utah has not always looked the way it does today. Its landscape has changed dramatically over time.			USGS relief maps-Provided by HG
	LD1.E02.gi02	graphic image	Visitors see a photo of what Utah would have looked like during the Pre-Cambrian.				Reefs off of Cancun Mexico Source: http://photos.mongabay.com/ yucatan/PICT0011.html provided by HG
	LD1.E02.gc01	graphic caption	Graphic caption for map and photo		In the Pre-Cambrian era (550 mya) Utah was at the Northern edge of the continent. North America was rotated 90 degrees clockwise (i.e. the modern northern edge of Utah faced East). Utah was near the northern seashore, but consisted mainly of lowlands/coastal plain type environments.		
	LD1.E02.gi03	graphic image	Visitors see a map of the Western United States during the Late Cambrian era. "You are here" marks the current location of the museum on the map.				USGS relief maps-Provided by HG
	LD1.E02.gi04	graphic image	Visitors see a photo of what Utah would have looked like during the Late Cambrian.				www.rixane.com/fantastic-ocean-3d-screensaver provided by HG
	LD1.E02.gc02	graphic caption	Graphic caption describes the Late Cambrian.		In the Late Cambrian (500 mya) all of Utah is underwater (ocean). Eastern Utah was the shallowest zone.		
	LD1.E02.gi05	graphic image	Visitors see a map of the Western United States during the Late Pennsylvanian era. "You are here" marks the current location of the museum on the map.				USGS relief maps-Provided by HG
	LD1.E02.gi06	graphic image	Visitors see a contemporary photo of what Utah would have looked like during the Late Pennsylvanian.				Photo: Dead Sea, from http://www.terragalleria.com/ middle-east/israel/dead-sea/picture.isra10329.html.
	LD1.EO2.gc03	graphic caption	Graphic caption for the Late Pennsylvanian.		During the Late Pennsylvania (300mya) a sea exists in Utah, the most extreme environment of which is the constricted Paradox basin of southeastern Utah. Tons of sediments deposited into basin, including massive amounts of evaporated salt. Shoreline deposits show evidence of dunes, and lots of ferns.		
	LD1.E02.gi07	graphic image	Visitors see a map of the Western United States during the Early Jurassic era. "You are here" marks the current location of the museum on the map.				USGS relief maps-Provided by HG

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	LD1.E02.gi08	graphic image	Visitors see a contemporary photo of what Utah would have looked like during the Early Jurassic.				Early Jurassic: Sahara Desert, from www.scienceclarified.com/ landforms/Basins-t.
	LD1.E02.gc04	graphic caption	Visitors read a panel that describes the Early Jurassic.		Early: During the Early Jurassic (195 mya) a Large Sahara-like desert occupied Utah. Giant sand dunes dominated the state, along with scattered oases that supported the life in the desert. The sand in the dunes likely arrived from the Appalachian Mountains to the east.		
	LD1.E02.gi09	graphic image	Visitors see a map of the Western United States during the Late Cretaceous era. "You are here" marks the current location of the museum on the map.				USGS relief maps-Provided by HG
	LD1.E02.gi10	graphic image	Visitors see a contemporary photo of what Utah would have looked like during the Late Cretaceous.				3 Photos: Atlantic coastal plain from www.spikehampson.com/ voyage_plan.html and South Florida Everglades, www.igowildlifephotography.com/ uploaded_image... and South Florida Everglades, www.beachdirectory.com/.../ evergladesaerial.gif
	LD1.E02.gc05	graphic caption	Graphic caption describes the Late Cretaceous.		During the Late Cretaceous (75 mya) an Ancestral Rocky Mountains was building in Western Utah, and eastern Utah was a broad coastal plain with abundant coal swamps on the western edge of an intercontinental seaway. A large portion of the eastern Utah was under the intercontinental seaway. It was much wetter and warmer during this time.		
	LD1.E02.gi11	graphic image	Map of the Western United States during the Early Tertiary era. "You are here" marks the current location of the museum on the map.				USGS relief maps-Provided by HG
	LD1.E02.gi12	graphic image	Visitors see a contemporary photo of what Utah would have looked like during the Early Tertiary.				
	LD1.E02.gc06	graphic caption	Graphic caption describes the Early Tertiary.		In the Early Tertiary (60 mya) sediments from the erosion of rising mountains to the west fill rivers. Large mountain valleys cover the west. Uinta Mtns uplift, large freshwater lakes (Flagstaff, Uinta, etc.) fill these mountain valleys. This era marks some of the warmest times in the Earth's history.		
	LD1.E02.gi13	graphic image	Map of the Western United States during the Late Tertiary era. "You are here" marks the current location of the museum on the map.				USGS relief maps-Provided by HG
	LD1.E02.gi14	graphic image	Visitors see a contemporary photo of what Utah would have looked like during the Late Tertiary.				
	LD1.E02.gc07	graphic caption	Graphic caption describes the Late Tertiary.		In the Late Tertiary (15 mya) the Basin and Range province formed, North America began stretching to the west, because of the earlier formation of the Rocky Mountains. Volcanic activity emplaced mineral deposits throughout Utah due to hydrothermal processes. Volcanoes erupt through the surface in Utah. Also, the Colorado Plateau began to rise.		

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	LD1.E02.gi15	graphic image	Visitors see a map of the Western United States during the Late Pleistocene era. "You are here" marks the current location of the museum on the map.				USGS relief maps-Provided by HG
	LD1.E02.gi16	graphic image	Visitors see a contemporary photo of what Utah would have looked like during the Late Pleistocene.				Photo: Cataract and Surprise glacier, Chugach Mountains, Alaska. From http://www.alaskaphotographics.com/cgibin/script.pl?op=viewpic&id=22688&oldop=http%3A%2F%2Fwww%2Ealask
	LD1.E02.gc08	graphic caption	Graphic caption describes the Late Pleistocene.		In the Late Pleistocene ~18 ka the Land is basically like it is today. Modern major physiographic features are in place. Glaciated mountain regions, cold forests at low elevations, and forests more common across the state. Little Cottonwood Canyon glacier exits into Lake Bonneville. Wetter climate. Lakes more common than they are today.		
LD1.E03 Plate tectonics			In this exhibit area, visitors read text describing plate tectonics, and watch a video. The video program plays on a global projection surface to tell the story of earth's layers and plate tectonics. Visitors see images of movement of the continents through time—and into the future.				
LD1.E03.gr01		graphic rail	Plate tectonics				
	LD1.E03.ms01	mindset	Mindset panel describes the structure of the earth and plate tectonics.	The surface of the earth is made up of dynamic plates that converge, diverge and move sideways with respect to each other. Over time, these movements helped shape the landscape and gave rise to three diverse geographic provinces in Utah.	The ground that we walk on is actually floating on top of an ocean of magma. Continents collide, break apart, rotate, and migrate all over the world, because of convection cells in the Earth. This process has been going on for billions of years, and the continents have changed dramatically as well. Varying thicknesses of the earth's crust shift like arctic ice, sometimes sliding across one another to make mountains, or split apart making huge valleys. Plate tectonics causes earthquakes, volcanoes, mountains, and shapes the climate of the world through the creation of geographic features. Different plate tectonic forces were responsible for creating Utah's three physiographic regions and the climatic regimes seen in them.		diagram/cut away of earth showing structure
	LD1.E03.gc01	graphic caption	Graphic caption describes ocean crust conveyor belt	Convection cells move the continents	In the upper mantle, magma at different temperatures rises and sinks in a circular or ovular pathway. The hottest magma rises from near the core of the Earth then cools as it reaches the top of the Mantle, that is, near the crust. The cool magma becomes denser than the hotter magma from below and sinks. The circular movement of magma forms global scale conveyor belts that slowly drag the continental plates.		diagrams of crust conveyor belt
	LD1.E03.av01	av	32" diameter global projection				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
LD2 Middle Rocky Mountains			As visitors descend the second switchback, a large picture window provides a panoramic view of the Wasatch Mountains, signaling visitors' arrival in the Middle Rocky Mountain exhibits. Set right into the canted walls are exhibits about this region's rocks, minerals, fossils and plants with specimens from the Museum's collection.				
	LD2.si01	section title	Section title and subhead introduces forces that formed the MRM	The MRM in Utah consists of mountain blocks that were uplifted by compressional forces in the Early Tertiary. Glaciers and streams have since eroded and shaped the landscape.	High mountains carved by streams and glaciers characterize the topography of the Middle Rocky Mountains province. The Utah portion of this province includes two major mountain ranges, the north-south-trending Wasatch and east-west-trending Uintas.		
	LD2.E01 Minerals and Rocks		Visitors will see 4 rock specimens mounted to the wall with an inset case holding examples of the minerals found within those rocks.	The Middle Rocky Mountains are comprised of many different rocks. The rocks, in turn, are comprised of a variety of minerals. See if you can spot the minerals on display embedded in the rocks.			
	LD2.E01.gi01	graphic image	background image for MRM				
	LD2.E01.qt01	quote	Quote related to the MRM on the east wall				
	LD2.E01.ms01	mindset panel	Mindset panel describes the formation of the MRM		The Middle Rocky Mountains arose as part of a mountain building event, the Laramide orogeny, about 70-40 million years ago. Most of the rocks in the Rocky Mountains were originally shale, siltstone, and sandstone, deposited in an ancient Paleozoic sea. Between 1.7 and 1.6 billion years ago, these sedimentary rocks were caught in a collision zone between sections of the Earth's crust called tectonic plates. These rocks were recrystallized into metamorphic rocks by enormous heat and pressure resulting from the collision. This process is called regional metamorphism . These recrystallized rocks were later uplifted, then eroded by glacial and stream activity.		
	LD2.E01.gi02	graphic image	diagram of contact metamorphism; photos of MRM features				
	LD2.E01.sx01	special exhibit	Rock: Alta stock granite				photo of place
	LD2.E01.ic01	inset case	Inset case with minerals from Alta stock granite parent rock				
	LD2.E01.ar01	artifact label	label for granite and minerals		Utah has many famous and productive mining areas. Almost without exception they are genetically related to igneous activity that occurred in the mid-Tertiary. Examples are the Cottonwood (Alta), Bingham Canyon, and Park City mining districts. This granite is from the Alta stock, a large body of magma that intruded the Earth's crust ~38 million years ago in the area now in Little Cottonwood Canyon. The minerals in the granite include magnetite, pyrite, quartz, plagioclase, K-feldspar, hornblende, and sphere. contact metamorphism here		
	LD2.E01.sx02	special exhibit	Rocks from Skarn zone	Becky to work on w. Dave at UMNH			photo of place

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	LD2.E01.ic02	inset case	Inset case with the minerals in the skarn zone.		tbd	Minerals:Vesuvianite (distinctive rosette habit) ludwigite (green and black varieties) tremolite (distinctive fibrous habit) garnet (tan and green varieties, in many case nice crystal habits) forsterite (nice weathering textures)	
	LD2.E01.ar02	artifact label	Specimen label- skarn rock and all minerals		Hot water plus magma helped many different minerals to form in the skarn zone. This area that is closest to the magma in the original rock houses minerals that are economically important, this is where Alta's mining was centered. The minerals found in the Alta skarn zone include: pyrite, bornite, galena, sphalerite, chalcopyrite, magnetite, silver, vesuvianite, green garnet, green diopside, muscovite, covellite, ludwigite, malachite, brochanite, chrysacola, hydroglossular, periclase, hematite, goethite, serpentine		
	LD2.E01.sx03	special exhibit	Rock: quartzite				photo of place
	LD2.E01.ic03	inset case	Inset case with the minerals that make up quartzite.			Minerals: quartz, potassium feldspar, clay minerals, and magnetite	
	LD2.E01.ar03	artifact label	Specimen label- quartzite and all minerals				
	LD2.E01.sx04	special exhibit	Rock: limestone				photo of place
	LD2.E01.ic04	inset case	Inset case with the minerals that make up limestone			minerals: calcite, dolomite, Forsterite, Diopside, Tremolite and Talc (These are the minerals in the marble that was formed due to m/m, and are not all present in the limestone)	
	LD2.E01.ar04	artifact label	Specimen label- limestone and its minerals				
	LD2.E01.ar05	artifact label	Label for slate slab			Large slate slab	
	LD2.E01.ar06	artifact label	Label for granite slab			Large granite slab	
	LD2.E01.ar07	artifact label	Label for limestone slab			Large slab of limestone	
	LD2.E01.ar08	artifact label	Label for quartzite slab			Large slab of quartzite	

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
LD2.E02 MRM Plants			This exhibit is a display of plants illustrating the relationship between surface geology, soil, and plants.				
	LD2.E02.pm01	photomural	MRM mountain meadow				MRM mountain meadow
	LD2.E02.ms01	mindset	Mindset panel	Elevation and soil drive plant diversity.	The geology and the geography of the MRM dictates what types of plants may grow there, and where the plants may grow. The plants here are adapted to different levels of moisture, sunlight, and soil composition. For instance, south facing slopes get much more sun than north facing slopes and have less time covered in snow. Soil composition is partly based on parent rock type; the rocks limestone and marble put lots of calcium in the soil which some plants cannot tolerate. Elevation is a critical factor for plants. Conifers and meadows are found in subalpine zones below the tree line. and cedars grow in forests in the foothills, along with grasses.		
LD2.E02.gr01		graphic rail					plant/ soil interactions
	LD2.E02.in01-in03	interactive	smell interactives (one per book)	on graphic panel			
	LD2.E02.ap01-02	activity prompt	activity prompt for smell interactive				
	LD2.E02.sx01-sx02	special exhibit	2 herbarium sheet flipbooks with 10 laminated plants in each flipbook		alpine/subalpine flipbook; montane/foothills flipbook	A1906-1924	cover image of elevational life zones
	LD2.E02.ar01-ar20	artifact captions	captions for herbarium sheet plants		fun fact, distribution, name, common name		map of where found, photo of plant in natural habitat
LD2.E03 Glaciation			Visitors are introduced to glaciation through a display of touchable striated rock slab, placed in a contextual horizontal setting and beside a photomural of a U-shaped (glacially formed) canyon.				
	LD2.E03.pm01	photo mural	Photo mural of a U-shaped canyon (possibly Little Cottonwood Canyon)		caption for photomural		Photograph of U-shaped Canyon
	LD2.E03.ms01	mindset	Mindset panel introduces glaciation, and includes process diagrams.	Glaciers have played an important role in shaping the landscape we see in the MRM today. Cirques, aretes, horns, moraines, U-shaped canyons, and hanging valleys are all evidence of past glaciation.	During the last Ice Age, the climate was much colder and wetter. The increased snow fall caused glaciers to form and stream down the mountain-side, not just here in Utah but also throughout the entire Rocky Mountains. Glaciers are composed of snow that has been compacted into solid ice. The ice picks up rocks from the surrounding valley as gravity forces it to slide down, carving out the mountain valley. During the sliding process the rocks caught up in the moving ice scrape and erode underlying bedrock. Over hundreds and thousands of years the valley takes on a wide “U” shape, like that we see in Little Cottonwood Canyon. Many different landforms are created from this process.		
	LD2.E03.gi01-gi05	graphic image	Process diagrams- how glaciers make a U-shaped canyon timeline of glaciations photos of Alpine glaciation features (u-shaped canyons, aretes, horns, cirques, col diagram of glacial flow				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	LD2.E03.gc01	graphic caption	caption for timeline of glacial periods		By definition, we are still in an ice age. An ice age is defined as an interval of time when large areas of the surface of the earth are covered with ice sheets (large continental glaciers). Usually when people talk about the "Last Ice Age", they mean the last time glaciers advanced on the continent. This is sometimes called the "Last Glacial Maximum" and occurred about 18,000 years ago. We are currently in a warm interval or "interglacial" within an ice age. I think it's important to make these distinctions.		
	LD2.E03.gc02	graphic caption	caption for U-shaped canyon diagrams				
	LD2.E03.gc03	graphic caption	Diagram of the erosional features of Alpine Glaciation. The features that are listed and described are aretes, tarns, horns, cirques, col, hanging valley and a U-shaped Valley.				
	LD3.E02.gc04	graphic caption	caption for erosional features of alpine glaciations				
	LD2.E03.gc05	graphic caption	diagram of glacial flow				
	LD2.E03.sx01	special exhibit	A display of a large rock slab that shows striations from glaciation.				
	LD2.E03.ar01	artifact label	label for glaciation rock slab			A2281	
LD2.E04 Fossils			Visitors learn about ancient environments (especially oceans) through a display of diverse fossils representing organisms that once lived in Utah before formation of the Middle Rocky Mountains.				
	LD2.E04.ms01	mindset	Mindset panel explains fossils and types found in the Middle Rocky Mountains	Fossils in the MRM provide evidence of ancient oceans and other past environments that covered Utah long before the mountains were created.	The MRM record hundreds of millions of years of geologic time, and contain many different fossil organisms from all across geologic time. Most of the fossils are found in ocean deposits that formed here when an ocean intermittently covered Utah. Some of the fossils are displayed here. Vertebrate fossils are rare in the MRM. It may be surprising to find ancient "sea shells" in the foothills and mountains of the MRM. In fact, the mountains haven't been here all that long in geologic time.		
	LD2.E04.sx01	special exhibit	Slabs with marine fossils—horn corals, brachiopods, fossils from cephalopod gulch representing Ordovician, Triassic, and Cambrian Periods (Paleozoic).				
	LD2.E04.ar01-ar03	artifact captions	captions for fossil slabs				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
LD3 Colorado Plateau			Ramping down to the Colorado Plateau, visitors catch sight of a centrally located cluster of exhibits and an image depicting the confluence of the Green and Colorado rivers. Hands-on exhibits and animation interpret the sedimentation that led to the Plateau's layer-cake geology and the uplifting and downcutting that carved its famed canyons. Nearby, a towering stratigraphic column juts up 20 feet into the space, spanning the Pre-Cambrian period to modern times, an iconic symbol of Earth's long history. A Jurassic-aged prosauropod specimen combines with other exhibits to further interpret the geological record and dating techniques. In an adjacent stylized setting, visitors find about the forces of weathering and erosion that led to the region's mesas, fins and hoodoos. Visitors manipulate a glass globe filled with sand to create dunes, and view live crustaceans that inhabit the region's potholes. The sequence concludes with exhibits interpreting the relationship between the region's soil and native plants and the volcanism that led to the formation of the Henry, La Sal, and Abajo Mountains.				
	LD3.si01	section intro	Title and subhead	The Colorado Plateau consists of rock layers deposited over millions of years. These layers were uplifted, then weathered and eroded to create canyons, hoodoos, and arches.			
	LD3.E01 Colorado Plateau/ Canyon Formation						
	LD3.gi01	graphic image					diagram of Colorado Plateau formation and layers
	LD3.E01.pm01	photomural	Colorado Plateau photomural				
LD3.E01.gr01		graphic rail					
	LD3.E01.ms01	mindset	Mindset panel describes the formation of the Colorado Plateau.	Layers of sedimentary rocks form the Colorado Plateau; this "layer cake geology" has been sculpted by wind and water into the spectacular landscape we see today.	The Colorado Plateau records millions of years of Utah's history. The bottom of the plateau formed in the Paleozoic (actually, the region is floored by Precambrian-age metamorphic and igneous rocks), when oceans left layers of sediment that overtime became lithified into the rocks we see today. Additional layers accumulated in the Mesozoic, including thick layers of wind blown dune sand. One of the most geologically intriguing features of the Colorado Plateau is its remarkable stability. Relatively little faulting and folding has affected this high, thick crustal block within the last 600 million years, so those millions of years of earth's history are still in the order they were deposited, a geologic timeline for us to read. In contrast, the rocks of the MRM and BR have been tilted, faulted and folded such that the youngest rocks are not necessarily on top.		aerial photos of Colorado Plateau; photos of Grand Canyon, Bryce Canyon, diagrams of formation, uplift, erosion

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					Beginning about 20 million years ago, during the Miocene Epoch both the Basin and Range and Colorado Plateau regions were uplifted as much as 3 kilometers. As the land rose, the streams cut deep channels. The forces of erosion have exposed the Plateau's vivid rock layers.		
LD3.E01.gr02							
	LD3.E01.gc01	graphic captions	Captions for bioregions				photos of bioregions; map showing locations of bioregions
	LD3.E01.fp01	focus panels	Focus panel describes CP bioregions		Bioregions are natural assemblages of plants and animals with discernible but dynamic boundaries. Bioregions are defined by physiographic and climatic limits that define the natural communities of organisms. The Colorado Plateau encompasses a unique combination of diverse geologic substrates, landforms, and climatic gradients, so it has many bioregions. An important part of the bioregion concept is the inclusion of cultures; humans and their history are linked to the soil, plants, and animals around them.		
	LD3.E01.gi02	image panel	Photo collage of Colorado Plateau bioregions				
	LD3.E01.gc02	graphic caption	captions for photos				
LD3.E01.gr03							
	LD3.E01.in01	interactive	Visitors will control water to create a diverse array of erosion patterns in a flat bed of sand that they smooth out and manipulate. The patterns will vary depending on how they distribute the sand and how quickly the water is released to flow through the sand.	The power and infinite potential of water as a force that moves and shapes the land.	Downcutting is a geological process that deepens the channel of a stream or valley by moving the sediment. Lateral erosion widens the stream or valley when downcutting approaches its base level. These two geological processes have shaped Utah's diverse and unique landscape.		
	LD3.E01.ap01	activity prompt	instructions for the erosion table	How would you sculpt the land? See how water shapes a sandy landscape…			
	LD3.E01.ms02	mindset panel	Mindset panel describes erosion	Water is very good at moving sediment, and is one of the most powerful Earth shaping forces.	The water picks up sand and clay from the river channel , moves it further downstream, redepositing it in slower river waters, also lakes, ponds, playas, etc. or in the ocean. Either way, sediment from the upper reaches of the river travels downstream until the river cuts the channel down to sealevel. The movement of sediment, or rock particles is called erosion. Canyons form by weathering and erosion of sediment, or downcutting of the river channel through geologic formations.		
	LD3.E01.gi02	image panel	Photo collage of eroded features of the Colorado Plateau				Photo of the confluence of the Green and Colorado Rivers, Gooseneck, river meanders
	LD3.E01.gc01	graphic caption	captions for photos				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
LD3.E02 Utah's Time Machine							
LD3.E02.ic01		inset case	Case with index fossils, set into photomural of Colorado plateau.				
	LD3.E02.ar01	artifact label	Precambrian fossils				
	LD3.E02.ar02	artifact label	Cambrian fossils				
	LD3.E02.ar03	artifact label	Pennsylvanian fossils				
	LD3.E02.ar04	artifact label	Early Jurassic fossils				
	LD3.E02.ar05	artifact label	Late Cretaceous fossils				
	LD3.E02.ar06	artifact label	Early Tertiary fossils				
	LD3.E02.ar07	artifact label	Late Tertiary fossils				
	LD3.E02.ar08	artifact label	Pleistocene fossils				
	LD3.E02.ms01	mindset	Mindset panel explains relative dating	Relative dating tells us which rock layer is older and which is younger; in general, the lower rocks are older, with younger rocks deposited on top of them.	Layers of sediment stack up with the oldest on the bottom and youngest on the top. Faulting and folding can turn them over and bend them, but originally, they are laid down in stacks. This simple concept called “Original Horizontality” is one of the most important in all of Geology. This fact helps geologists to determine if objects in layers are older or younger than objects in other layers, although they will not know how much younger or older. It allows anyone to know the relative ages of events in Earth history. Fundamental Principles of Relative Dating: 1. Superposition - oldest layer on bottom, youngest on top along with fossils within the layers 2. Original horizontality - sediments deposited in horizontal layers 3. Cross-cutting relationships - igneous intrusions or faults must be younger than the rock they intrude or displace" 4. Law of Cross-Cutting Relationships - An intrusion or fault that cuts through another rock is younger than the rock it cuts. [Sills vs buried lava flow? Must look for heat effects.] 5. Principle of Inclusion -Inclusions are older than the 6. Principle of Faunal Succession - Fossil organisms succeed one another in a definite and determinable order, so any time period can be recognized by its fossil content. General evolution pattern is from simple to complex organisms		
	LD3.E02.gi01	graphic image	biostratigraphy diagram				
	LD3.E02.gc01	graphic captions	Captions for biostratigraphy diagram	We use fossils to help us correlate rock layers in a region. If the same fossil occurs in both places, the rocks are of the same age.	Index fossils are easily identified, geographically widespread, and existed for a short period of geologic time. They are great time markers - if you find one, you know relatively, you need radiometric dating for "exact" dates "when" you are. Finding index fossils in different places lets you correlate one rock layer in one region to another in a different region. The process of dating rocks by their fossils is called Biostratigraphy, which means basically “The study of layered life”. In this display, we've placed some important Utah index fossils.		diagram/illustration of biostratigraphy

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
LD3.E02.gr01		graphic rail	Prosauropod				
	LD3.E02.gi01	graphic image	Contextual image of the landscape and illustration of Prosauropod, to help visitors identify the specimen				
	LD3.E02.sx01	special exhibit	prosauropod specimen			Prosauropod specimen A1183	
	LD3.E02.ar09	artifact label	Label for prosauropod fossil		Prosauropods are the ancestors to the long necked giants found later in the Jurassic, but this type of dinosaur is only found during the early Jurassic. This animal roamed the Sahara-like desert of Utah 195 Ma. The fossil is in such an odd position, that it seems a sand dune collapsed, trapping the prosauropod inside until recently. Body fossils such as this are very rare in the desert sand deposits, making this find quite important. Additionally, it adds a sense of life to the mostly barren landscape of Utah 195 Mya.		
	LD3.E02.fl01	family label	Family label for prosauropod	asking Mark (UMNH) for more info			
LD3.E03 Colorado Plateau Stratigraphy			An abstracted stratigraphic column of the Colorado Plateau shows the colorful layers and different rock types.				
	LD3.E03.sx01	special exhibit	Strat Column				
LD3.E03.gr01		graphic rail					
	LD3.E03.gi01	graphic image	Biostrat diagram (explains column)				diagram of strat column with layer groupings, layer cake formation explanation and photos of Utah examples.
	LD3.E03.ms01	mindset panel	Mindset panel describes the layers of the Colorado Plateau	The Colorado Plateau is a "lithic layercake."	Throughout the Paleozoic Era the Colorado Plateau region was periodically inundated by tropical seas. Thick layers of sediment were deposited in these seas that became the limestone, sandstone, siltstone, and shale of the CP. Over 300 million years passed as layer upon layer of sediment accumulated. Then, in the Age of Dinosaurs, huge accumulations of dune sand was deposited and later hardened to form sweeping arcs of cross-bedded sandstone. Eruptions from volcanic mountain ranges to the west buried vast regions beneath ashy debris.		
LD3.E04 Weathering and Erosion			This exhibit area is a stylized setting evoking eroded rock formations and exposed stratigraphy. A Sand dune formation interactive shows that dune formation is a depositional process.				
LD3.E04.gr01		graphic rail					
	LD3.E04.ms01	mindset	Mindset panel explains the relationship of weathering and erosion	Weathering and erosion are major shapers of the landscape and are an important part of the rock cycle. Weathering is the deconstruction of rocks, erosion is the movement of rock particles.	Weathering happens through physical interaction such as rain hitting rocks, freeze-thaw action, or from rock particles slamming into one another. Weathering breaks up rocks into particles; erosion is the movement of these weathered rock particles. Unlike earthquakes and volcanoes, these shapers of the land work slowly and gradually, but they also produce dramatic results.		

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	LD3.E04.in01	interactive	Sand dune formation interactive- (Aeolian landscape with Utah-specific context.)				
LD3.E04.gr02		graphic rail					
	LD3.E04.ap01	activity prompt	Instructions for the use of the sand dune interactive	Use your blower to shape the landscape			
LD3.E04.gr03		graphic rail					
	LD3.E04.sx01	special exhibit	Pothole aquarium exhibits set into table top.				
	LD3.E04.fp01	focus panel	Focus panel describes potholes and pothole organisms	In the deserts of Southern Utah, vernal or ephemeral pools occur that remain dry for much of the year. When they are filled with rain water, the dormant life forms that inhabit them spring to life.	Potholes are common in Southern Utah where they form in bedrock, most typically sandstone. They form through weathering and erosion. Potholes are unique ecosystems. Many potholes have endemic fauna and flora. Potholes are hard living environments. They often dry up, they may freeze and they have rapid changes in water temperature and pH. The animals and plants that can live in potholes have found a unique biological niche. They can lie dormant for 4 years, then when brought to life by rain, live an entire life cycle in just 20 hours!		photos, diagrams or illustrations of pothole creatures; photo of dry pothole and filled pothole
	LD3.E04.ar01	artifact label	Label for pothole organisms		tadpole shrimp Triops sp. Well adapted to life in the desert, these crustaceans live in temporary rainpools which form in low lying areas during the summer monsoons. Hatching from eggs which have lain dormant in the soil, they mature quickly feeding on detritus washed into the pool, mate, and deposit their eggs before the pool dries up.		
LD3.E04.gr04		graphic rail					
	LD3.E04.fl01	family label	Family label at pothole window	Tadpole shrimp spring to life when it rains.	Triops, or tadpole shrimp, have adapted to life in potholes. Their eggs stay in dry potholes for many years. When the pool fills with water, some of the eggs hatch. It takes less than a day for the shrimp to grow from egg to adult! They take advantage of every moment when the pothole is water-filled.		
	LD3.E04.ar02	artifact label	Label for crossbedded sandstone		The angled pattern seen on the side of this sandstone is evidence of windblown sand dunes. In which case the foresets ("angles") are the preserved remnants of the leeward side of the dune.		
LD3.E05 CP Plants			Plant diversity of the CP				
LD3.E05.gr01		graphic rail					
	LD3.E05.ms01	mindset	Mindset panel describes the CP plants and their relationship with the land	The Plateau, with its range of soils and elevation, is marked by great ecological diversity.	On the semi-arid Colorado Plateau elevation is an important factor in determining what assemblages of species or biotic communities occur in a given location. At higher elevation, it's colder and rainier. The Plateau is marked by great ecological diversity. Climate, elevation, and soil combine to create many micro-zones that support an amazing range of plants and animals. Six of the seven North American life zones are represented on the Plateau (only subtropical is absent), a rare biological occurrence.		
LD3.E05.gr02-04		graphic rail					

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	LD3.E05.in01-in03	interactive	Interactive of plant scents	on panel			
	LD3.E05.ap01	activity prompt	prompt for scent interactive				
	LD3.E05.sx01-sx03	special exhibit	3 herbarium flip books with 10 plants/ea.	on panel		A1890-1905	
	LD3.E05ar01-ar30	artifact label	artifact label for specimens				
LD4 Basin and Range							
	LD4.si01	section title	Title and subhead	The Basin and Range consists of a series of north-south trending mountains isolated by elongate flat basins. This topography is a result of the “stretching” of the western US region that began about 30 mya and continues today.	The name comes from the wide basins stretching between mountain ranges from central Utah through western Nevada.		
	LD4.E01.gi01	graphic image	diagram of Basin and Range				
	LD4.E01.pm01	photomural	Photomural of the Basin and Range		caption for photomural		
	LD4.E01 Rock Cycle		Visitors see a large diagram of the rock cycle illustrated with rock specimens.				
	LD4.E01.ms01	mindset	Mindset panel describes rock cycle	Rocks are recycled over time; they may return to the mantle layer, be broken down into sediments and redeposited, combined with organic matter to form soil, or transformed into other kinds of rocks.	Everything in the Earth gets reused and recycled, including the rocks. The rock cycle is not one circle but a set of interconnected subcycles and transformations. There are three main rock types: igneous, metamorphic, and sedimentary. Igneous rocks form from crystallized magma. Metamorphic rocks form when any of the three rock types gets altered by heat and pressure. New minerals and rock structures occur in this process. Sedimentary rocks form from the weathering and erosion of any of the three rock types.		
	LD4.E01.gi01	graphic image	Graphic image of the rock cycle				
	LD4.E01gc01-06	graphic captions	Captions describe the processes: heat and pressure, weathering, transportation, and deposition, cementation and compaction that cause the rock cycle.		Each segment of the rock cycle is typified by a series of processes that are unique to that portion. Heat and pressure Volcanic rocks are always melted, through subduction below another plate and at rift zones, and hot spots. Metamorphic rocks are always altered by pressure and/or temperature, but hardly ever fully melted. Different metamorphic rocks form by altering the temperature and pressure of the same original rock. Uplift Some of the same plate tectonic processes that form metamorphic rocks are responsible for starting the sedimentary cycle. Mountains form from the uplift of rocks during collision from another plate. When a region is uplifted, gravity intensifies erosive processes. Weathering The uplifted rocks start the sedimentary cycle because of weathering and gravity. The exposed rocks are broken apart by physical and chemical weathering processes, the gravity see above pulls them toward sea level.		diagram of rock cycle; images of weathering and erosion, deposition, burial and heating placed in the appropriate positions in the graphic diagram of the rock cycle.
	LD4.E01.sx01	special exhibit	Rock touch samples mounted on graphic of rock cycle				

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	LD4.E01.ar01	artifact caption	Label for conglomerate		This type of sedimentary rock forms near the source, usually mountains, of the original rock. It consists of large chunks of rock, some rounded some not, as well as sand or or mud to cement to pebble to boulder sized chunks together.		
	LD4.E01.ar02	artifact caption	Label for sandstone		Further down river systems, the large chunks from conglomerates become broken apart to a sandstone. The term sand refers to the size of the mineral grains in this type of sedimentary rock. As one gets further down the river (or the longer it's been reworked by waves, etc.), the coarse sand becomes medium grained and then fine grained.		
	LD4.E01.ar03	artifact caption	Label for siltstone		Siltstone is made when sand grains get worn down more to silt size. When taken between your front teeth, silt will be gritty, but not rocky like sand.		
	LD4.E01.ar04	artifact caption	Label for claystone		Claystone, or mudstone, is the finest material in this group of sedimentary rocks. When taken between your front teeth you will not feel any grit with a pure clay stone. Special clay minerals form most of this rock type. Clay minerals are not quartz or feldspar, but unique to themselves.		
	LD4.E01.ar05	artifact caption	Label for coal		Plants pile up in low lying areas, underwater, oxygen absent., with very little input of sediment. The thickness of a coal layer is 10-30 times less the original thickness of the plants.		
	LD4.E01.ar06	artifact caption	Label for limestone		Limestone takes a variety of forms (eg. stalactites, tufa, coquinas, oolites, micrites, crystalline, travertine, coral reefs, etc. etc.) and forms in a variety of ways. Limestone can be precipitated directly from water (chemical) or from organisms secreted it in their shells (biochemical) which rain down on the ocean/lake floor after the organism dies. The can also be a combination of both. Limestone is an important component of the earth's surface.		
	LD4.E01.ar07	artifact caption	Label for basalt		Mid-ocean ridges are the areas in the middle of oceans where new crust is being formed. The new crust comes straight from the Mantle of the Earth and is pure basalt. This igneous rock is made mostly of iron, with little quartz actually, basalt is primarily silica (basalt is about 45-52% silica) - as are all rocks), it just contains less than granite (>65% silica), etc.) . It occurs in hot spots like Hawaii also continental hot spots like the Snake River plain-Yellowstone.		
	LD4.E01.ar08	artifact caption	Label for peridotite		Peridotite is what composes most of the upper mantle. Gabbro is the intrusive equivalent of basalt if that is what is meant by "crystallized" . The green mineral is olivine.		
	LD4.E01.ar09	artifact caption	Label for rhyolite		Rhyolite has the same chemical make up as granite, it is just exploded from a volcano and the magma cools quickly. Quartz (also feldspar and plagioclase) is the dominant mineral.		
	LD4.E01.ar10	artifact caption	Label for granite		Granite is a magma that contains a very large percentage of quartz Silica. This magma cools very slowly in the Earth's crust, allowing time for large crystals to grow.		
	LD4.E01.ar11	artifact caption	Label for porphyry		Porphyry igneous rocks refer to any type of igneous rock where large crystals are surrounded by fine grained matrix. This occurs when the lava begins cooling slowly, giving time for the first crystals to grow, but then is erupted and the remainder of the lava cools quickly.		

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	LD4.E01.ar12	artifact caption	Label for marble		recrystallizing limestone		
	LD4.E01.ar13	artifact caption	Label for quartzite		A sandstone gets heated and compressed, the edges of the sand grains melt together. This type of metamorphism is "Low-grade."		
	LD4.E01.ar14	artifact caption	Label for gneiss		Gneiss is formed from granite can also be other rock types that is taken to great temperature and pressure, enough to force all of the light colored together and the dark colored minerals together. The minerals align in response to the pressure .		
	LD4.E01.ar15	artifact caption	Label for schist		Schist is a general term for a metamorphic rock that is shiny due to the alignment of mica and other minerals caused by intense heat and pressure. It usually contains other minerals such as chlorite, talc, horneblende, quartz, and garnet. All schist is formed from mudstone or siltstone, but depending on the depth the rock is taken to, temperature and pressure changes creates different types of schist.		
	LD4.E01.ar16	artifact caption	Label for metamorphosed basalt		Amphibolite can form from the metamorphism of dolerites *(intrusive* ig rx), "dirty" marls, dolomites, etc. The primarily mineral is amphibole, sometimes tremolite or actinolite. Feldpar, pyroxene, chlorite, epidote and garnet can be present.		
LD4.E03 Wasatch Fault/ Front			This exhibit area informs the visitor about the Wasatch front and fault. Visitors learn about faults through the manipulation of models and by enjoying the earthquake interactive.				
	LD4.E03.ms01	mindset	Mindset panel describes Wasatch Fault, associated dangers	You're in earthquake country! The Wasatch fault, the most significant fault in Utah, runs below the site of the museum.	A fault is a break in the earth's crust along which blocks of earth slip past each other. This slipping is the earth's way of adjusting to the buildup of strain within its crust. Movement can be horizontal, vertical, or both. The Wasatch fault is called a normal fault, a term that means that the slip is mostly vertical and the block that overhangs the fault plane (the valley block) has slipped down relative to the block that lies beneath the fault plane (the mountain block -i.e. Wasatch Range)). We know there have been many large earthquakes on the Wasatch Fault in the past. In many places, like the mouth of Little Cottonwood/Bells Canyon, there are fault scarps. Scarps (steep slope breaks) are also visible around Salt Lake City. The Wasatch Fault is essentially the boundary between the Basin and Range province to the west and the Middle Rocky Mountains to the east. The Wasatch Fault is just one of the many faults around the world.		
	LD4.E03.gi01	graphic images	images of scarps, triangular facets				
	LD4.E03.gi02	graphic image	Intermountain Wasatch Belt map				
	LD4.E03.gi03	graphic image	World earthquake map				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	LD4.E03.gc01	graphic caption	Caption for earthquake map		Most of the world's earthquakes and active faults occur in narrow belts that outline a mosaic pattern on the earth's surface, much like the patchwork surface of a soccer ball. These zones define the edges of large crustal plates. The plates ARE the earth's surface and part of the interior in different directions. Earthquakes occur as these plates slide by, bump into, plunge beneath, or spread apart from each other. Not all earthquakes and faults occur at plate margins, though. The Intermountain seismic belt (ISB), in which the Wasatch fault is located, is one example.		Map of globe showing recent earthquakes, faults, and plates; location of Wasatch Fault called out; map of intermountain west showing faults
	LD4.E03.in01	interactive	jump on seismometer			seismometer, jump pad, screen	
	LD4.E03.av02	av	av screen for seismometer				
	LD4.E03.ap01	activity prompt	prompt for seismometer	Jump on the circle and see the mini quake you made!	The seismometer picks up the vibration your jump made. Similar recording devices chart the energy released in earthquake waves.		
	LD4.E03.fl01	family label	Family label for boulder w. scarp	pending boulder selection			
	LD4.E03.ar01	artifact label	Label for boulder with scarp				
Seismograph/ earthquake map			Real-time seismograph with 3 remote stations. Remote stations capture the activity from: 1)Marysvale, UT 2) Yellowstone National Park 3) Hansel Valley Utah				
	LD4.E03.av01	av					
	LD4.E03.fp01	focus panel	Focus panel describes earthquake monitoring and recording.	Seismographs detect the energy waves generated by earthquakes.	Networks of seismographs help us locate and monitor earthquake activity. When an earthquake happens, the location in the Earth's crust is determined by the triangulation method. Working back from when a seismograph records the earthquake, and comparing seismographs at different locations, we can roughly locate the earthquake. Each year, tens of thousands of small earthquakes occur throughout the United States. These quakes don't cause damage, and they earth provide a wealth of information that enables seismologists and engineers to better assess the distribution, frequency, and severity of seismic hazards throughout the country. Seismologists and engineers use this information to assess public safely and seismic design criteria, as well as basic research. The readout here is compiling date from 3 regional seismographs. Improved Seismic Monitoring - Improved Decision-Making: Assessing the Value of Reduced Uncertainty (2006) Board on Earth Sciences and Resources http://books.nap.edu/openbook.php?record_id=11327&page=77		
	LD4.E03.ar01-04	artifact captions	IDs describing seismographs above.		This readout compiles data from 3 seismographs located in different parts of the West. As the earthquake sends out waves they arrive at different times to the various seismograph stations. A central computer calculates and compares those times, circles are drawn according to the arrival times and the intersection of the circles marks the spot of the earthquake.		

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
LD4.E03.tt01		table top					
	LD4.E03.in01	interactive	Earthquake interactive- a step on shake platform. Visitors select one of the local earthquakes, and experience the magnitude of the quake. A monitor displays the seismographic read out for that earthquake.	Pick your quake and rattle and roll	23 mi. NW of Brigham City Utah 9/6/2008 mag. 3.1 near Magna, UT 5/34/06 2.3 Wells UT/NV border 2/21/2008 mag. 6.0 Herriman Utah 1992 4.3 mag. 16 miles SE of Salina UT 1/29/89 mag. 5.4 SF 4/18/1906 7.9 Loma Prieta 10/17/89 mag. 6.9 or Northridge 1/17/94 mag. 6.7		
	LD4.E03.ap01	activity prompt	for earthquake interactive		touch epicenter to experience the quake		map showing earthquake locations
	LD4.E03.gc01	graphic caption	text describing fault types	There are three types of faults: Normal, strike-slip and reverse faults.	Normal faults are high angle faults where the hanging wall slides down relative to the footwall. The hanging wall is the block that lies above the fault plane. The footwall lies below the fault plane. The hanging wall is *never* below the footwall They are named that because this was the kind of fault that 18th century English coal miners Normally found within the mines. A reverse fault is where the hanging wall moves up relative to the footwall. A Strike-slip fault is when fault blocks slide past one another laterally.		fault diagrams
	LD4.E03.gc02	graphic caption	captions for earthquake damage images				photos of earthquake damage to match quakes in interactive, also historical (alaska, san francisco)
LD4.E04 Human Interactions			Visitors look at a display of objects and graphics that tells the story of the interactions of people and the BR landscape. Human activities like mining, grazing, and development are rapidly changing the landscape.				
LD4.E04.tt01		tabletop					
	LD4.E04.av01	av	This digital talkback station gives visitors a chance to react to the Human Interactions audio, and their connection to the land and sustainability.				
	LD4.E04.ap01	activity prompt	Prompt encourages visitors to record their connections to sustainability related to Utah				
	LD4.E04.ms01	mindset	Mindset panel about mining, grazing, climate change and development and its effects on the land.	Because of its diverse geologic history, Utah's landscape is rich with resources. Resource acquisition and use has a significant impact on the land.	Utah's grand geologic history has produced many resources useful to humans, such as those minerals found underground. Utah also has a climate and ecosystem ameniable to grazing. And Utah's rising population has caused expansion into rural areas. All of these changes require destroying altering the original landscape in order to take advantage of the resources. Over one hundred years of resources utilization has left areas of Utah in dire need of conservation in order to maintain a semblance of its original legacy. Humans are changing the landscape at rates that are orders of magnitude above the natural processes the formed it.	BM to talk to eric and becca (UMNH) re: climate change	
	LD4.E04.ic01	inset case	Inset case of mined minerals, and ores.			mined minerals and ores	
	LD4.E04.ar01	artifact label	Label about mining and the formation of the Bingham Canyon stock.	tbd	Utah's mineral resources are often associated with igneous activity during the Tertiary. Hot, molten rock intruded the country rock, causing adjacent rocks to be metamorphosed and hot fluids to run through veins and cavities. Precious metals and minerals are formed in this fashion. Bingham canyon has one of the richest deposits of minerals on earth.		

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	LD4.E04.gi01-gi04	graphic images-	A series of transparent graphic images including maps and photos can be layered to reveal before and after images of land use and transformation due to grazing, mining, development, and climate change				
	LD4.E04.gc01-gc04	graphic captions	captions for images				
	LD4.E04.sp01	story panel	story about mining from multiple viewpoints				photo of speakers
	LD4.E04.sp02	story panel	story about grazing from multiple viewpoints				photo of speakers
	LD4.E04.sp03	story panel	story about climate change				photo of speakers, Daybreak
	LD4.E04.sp04	story panel	story about development				photo of speakers
	LD4.E04.ar02	artifact label	label for sand and gravels		Sands and gravel is not just a pile of dirt! These deposits contain information about Utah's recent geologic history. Many of the landforms are being destroyed to build highways and buildings. What is the value of these geoantiquities? (scientific, educational, aesthetic, historical values)		
	LD4.E04.av02-av05	av	Four recordings of Utahns speaking about their relationship with land; living on it, working with it and enjoying it for recreation. The focus is on sustainable relationships to the land and to resources.				
	LD4.E04.ap02	activity prompt	Prompt encourages visitors to listen to land-related stories from Utahns				
LD4.E06 B & R Formation			Visitors see graphics, read texts and manipulate interactive model to gain an understanding of the B&R formation.				
	LD4.E06.ms01	mindset	Mindset panel describes the formation of the Basin and Range	The Basin and Range formed when the earth's crust and mantle stretched - over 100%! Los Angeles would have been a suburb of Salt Lake City before the expansion.	During the late Cretaceous and early Tertiary the Rocky Mountains were pushed up by the Pacific plate sliding to the east under North America. However, about 20 million years ago the plate changed directions and started moving toward the northwest. The change in direction of the Pacific plate, along with the friction created by the movement of the plate under North America, caused the previously compressed area to begin spreading out, and created a series of faults. The valleys seen throughout western Utah and Nevada are the areas of land being dropped by the normal faults. The mountain ranges are the areas not being dropped.		aerial view of Basin and Range; map/diagram of Basin and Range; diagrams of formation
	LD4.E06.gi01	graphic image	aerial view of Basin and Range; map/diagram of Basin and Range; diagrams of formation				
LD4.E06.tt01		table top					

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	LD4.E06.in01	interactive	This interactive demonstrates the formation of the Utah mountains and valleys by modeling the changes in the terrain that resulted from the separation of tectonic plates.		The interactive is built into a counter and protected by an acrylic cover. A lever protrudes from between simulated rock layers in the counter. • The visible part of the interactive is comprised of parallel angled “blocks” that separate as the lever is pulled to the left. As the expansion occurs the “secondary blocks” descend between the “primary blocks” that remain level as they move. • A concealed scissor mechanism simultaneously replicates this action across the interactive. • A hydraulic or electromechanical device resets the interactive to the compressed configuration after it is expanded and the operator releases the handle. • A system of tracks, block carriages, block support posts and a scissor apparatus is illustrated in the drawings as a conceptual basis for the mechanical operation.		
	LD4.E06.ap01	activity prompt	Activity prompt encourages visitors to raise the lever that results in the rock layers expanding.				
LD4.E07 House Range							
LD4.E07.rc01		rail case	Rail case holds trilobites and soft-bodied creatures from the House Range				
	LD4.E07.ar01	artifact label	Label for trilobites			A0978-990	
	LD4.E07.ar02	artifact label	Label for soft-bodied animals				images of creatures in life
LD4.E07.tt01		table top					
	LD4.E07.fp01	focus panel	Focus panel about the House Range and Utah's cambrian fossils.	Utah contains some of the most spectacular Cambrian fossils in the world	Very few places in the world preserve fossil organisms without hard shells. Utah is one of those places. The Spence Shale, of the House Range, is one of the best examples of these special fossil deposits where rare organisms such as soft worms are preserved. In addition to this, the House Range contains an amazing array of Trilobites and other fantastically preserved animals. These organisms were likely preserved in deeper ocean with very little oxygen, which prevented rapid decay and allowed burial and fossilization. Exposures of these fossil beds within the Basin and Range are some of the best places to find these animals in the world.		
LD4.E07.gr01		graphic rail	LD- PW overlook				
LD4.E08 Island Biogeography			Illustration of elevation and latitude and the biodiversity among the gradient (see our Wasatch installation). Relic refuge=high places remained a refuge for plants and animals as the ice age ended. Incipient speciation; mountain ranges provide isolated habitats, which is the foundation for speciation. The isolation was creased via global warming at end of last ice age. Continued global warming due to human interactions has changed modern geographic/elevation range of animals.				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	LD4.E08.ms01	mindset	Mindset panel explains island biogeography and how it affects Utah	Sometimes populations become isolated when their preferred habitats become isolated, as on distinct ocean islands, or islands of mountains separated by desert.	Island Biogeography is a term that describes the isolation of organisms because their preferred habitats are isolated. Like islands in the ocean, mountain ranges can isolate organisms adapted to certain climatic conditions. The areas in between the mountain ranges are not suitable for the organisms to survive and are equivalent to the ocean between islands. We see this in the Great Basin, where desert expanses separate mountain ranges. Once populations are isolated, they may diverge,, ultimately evolving into different species. There are 15 mountain ranges exhibiting Island Biogeography in Utah.		diagram of island biogeography; map showing mountain ranges in Utah that exhibit Island Biogeography, or a Sat photo showing the B&R mountains and valleys.
	LD4.E08.av01	av	Visitors watch a short animation that shows how 'sky islands' are formed when isolated communities of organisms begin to evolve separately.				
	LD4.E08.gc01	graphic caption	accompanies map/aerial photo				
	LD4.E08.gc02	graphic captions	Graphic captions accompany before and after photographs. Topic is a futures component: human interactions can either exacerbate or mitigate effects of global warming—as indicated in Eric and Becca's work on changes in climate that change the ecosystem.	Humans are causing the climatically sensitive taxa to shift their living ranges higher.	Global warming is causing the global temperature to rise. At the end of the last ice age (see above comment about "the last ice age"), rising temperature caused organisms adapted to the cold to live on mountains where temperatures still were cooler, leaving the mountain valleys. The rising temperatures due to human induced green house gases are causing the same effect. Researchers are the Utah Museum of Natural History are showing that plants and animals sensitive to temperature and rainfall are actually living higher on the mountain to stay within their preferred cooler climates, as compared to 80 years ago.		
LD4.E09 **B & R Plants, Soil, Parent Rock, Cryptobiotic Soil**			Display of plants illustrating the relationship between surface geology, soil, and plants. Plants are displayed according to the elevation at which they grow.				
	LD4.E09.ms01	mindset panel	Mindset panel describes elevation and plant communities.	Because elevation in the Basin and Range varies thousands of feet, multiple plant communities live here.	Three major plant communities grow in the Great Basin and Columbia Plateau: sagebrush, salt desert shrub, and pinyon-juniper woodlands. Temperature and moisture dictate where each is found. Salt desert shrub usually grows in low, dry elevations, whereas sagebrush requires surroundings with greater moisture levels and sandy, slightly alkaline soils. Pinyon-juniper woodlands occur at the base of mountains, while forests of pine, spruce, fir, and aspen blanket the high peaks. The sagebrush community, which consists of a mixed mosaic of shrubs, perennial grasses, and forbs, is the most common. These plant communities are home to more than 200 bird, 70 mammal, and 20 amphibian and reptile species.		photo/diagram of different plants at different elevations; photos of different plant communities
	LD4.E09.gi01	graphic images	images of elevations				
	LD4.E09.gc01	graphic caption	captions for elevation images				
LD4.E09.gr01-gr05		graphic rail					

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	LD4.E09.gc02-gc06	graphic caption	text describing range changes of small mammals in B&R mountains as discovered by the Drs. Above. Human induced.	BM talk w. Becca and Eric			picture of Drs. Becca Rowe and Eric Rickart in the field collecting data for climate change study; diagram/map of mammal ranges
	LD4.E09.gi02-gi06	graphic image	Various animals will supplement the plant books, strengthening the connection between animals tracking their preferred plant habitat.	specimens?	tbd		
	LD4.E09.gi02-gi06	graphic image	5 soil profiles	Text pullouts on the graphic for specific soil profile features			soil and parent rock samples
	LD4.E09.gc07-gc11	graphic caption	captions for soil profiles			cryptobiotic soil A2051	
	LD4.E09.in01-in05	interactive	Plant scent activity				
	LD4.E09.ap01-ap05	activity prompt	for plant scent activity				
	LD4.E09.sx01-sx05	special exhibit	Plant booklets	5 plant booklets w. with 10 pages each.	captions for plants; name, location, growth habit, fun fact	A864-867 playa A2282-2288 foothills/shrub A2289-2298	
	LD4.E09.ar01-ar50	artifact labels	artifact labels for herbarium samples				
LD4.E10 Homestead Cave							
LD4.E10.tt01		table top	Table top with microscope lets visitors examine the evidence from Homestead Cave. Microscopes for owl pellets, hackberry nutlets, kangaroo rat skulls				
	LD4.E10.ap01	activity prompt	Prompt encourages people to use microscopes to examine Homestead Cave specimens				
	LD4.E10.ms01	mindset	Mindset panel describes how Homestead Cave records past fauna and climates	Eight feet of sediment in Homestead cave preserves a record of natural resources and changes in the land. This evidence of past climate change was collected and left by the animals that used the cave over thousands of years.	Homestead Cave is a shallow (~50 ft deep) cave that contains ~8 ft of sediment preserving a record of the animals that used the cave over the last 11,000 years. Plants that are present were either blown in by the wind or brought in by animals. The cave located on the NW side of the Great Salt Lake above one of the ancient Bonneville Shorelines (the Provo shoreline). Humans discovered the cave 5000 years ago, but it seems they did not use it very much. Luckily, the cave was utilized by lots of animals, especially owls and pack rats, and the skeletal remains of vertebrates, along with the seeds, pollen, and plant materials they gathered and ate, can be used to see changes in climate through time.		photo of Homestead Cave
	LD4.E10.gc01	graphic caption	Captions describe the deposition in the cave.	18 distinct time slices are captured in the debris of the cave.	Deposition did not occur at an even pace, but instead experienced episodes of hiatus creating a stratigraphy that allows scientists to divide the cave deposit into 18 distinct time slices. Almost all of the vertebrate remains found in the Homestead Cave were deposited within owl pellets. After examining the numbers of kangaroo rat, pocket mouse, and hackberry nutletts, scientists were able to find evidence of climate change in the past 11,000 years, from a cooler wetter climate to the drier climate we know today.		Schematic illustration of Homestead Cave section

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	LD4.E10.ar01	artifact label	Artifact label for wood rat fecal pellets		Wood rat midden and pellets Wood rats and pack rats (Neotoma spp.) both create middens, which are large nests of gathered sticks, grass, bones, and almost anything else they can find within their foraging range. They like to build their middens in crevasses and caves and were active in a portion of the Homestead cave. In turn, raptors eat the rats, and left their remains within the cave.	A2263	
	LD4.E10.ar02	artifact label	Artifact label for Hackberry nutlets		Hackberry plant Hackberry (Celtis reticulata) is a small bush that provides a fruit with a large nutlett. It provides food for a large number of vertebrates including small birds and rodents. The nutletts are extremely well preserved in the sediment record and also provide a valuable record of changes in plant abundance through the Homestead Cave deposit.	A2365	
	LD4.E10.ar03	artifact label	Artifact for Kangaroo rat skull		Kangaroo rat and pocket mouse remains Rodent remains such as two species of kangaroo rat (Dipodomys microps and ordii) and two species of pocket mouse (Peromyscus parvus and longimembris) are valuable food sources for raptors like the owl. Kangaroo rats are the most abundant component of the vertebrate remains in the Homestead Cave assemblage. Pocket mice are also abundant.	A2364	
	LD4.E10.ar05	artifact label	artifact label for owl pellets		Owls eat their food whole, digesting the meat from small mammals while leaving their bones. They then regurgitate all of the bones and fur of their prey into convenient packages that are finely preserved in Homestead cave. By tracking the types of animals found in the pellets, changes in faunal composition can be seen.	A2361, 2362	

LIFE

Explore the structure, function and evolution of life from genes through regional ecosystems.
1. To fully understand the properties of life, we need to study it at different physical scales.
2. Utah's diverse geography has given rise to rich biotas whose species interact with each other and the physical world.
3. Life's diversity is the result of evolution reshuffling the same "biobytes."

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
LF1 Introduction			Entering from sky, visitors will see an animated light display of examples of different scales of life, from single cells to ecosystems. These slide projections include examples of the key Utah critters, and introduce visitors to the idea of scales of life, and to the Utah critters they will see throughout the observatory.				
	LF1.E01.ip01	introductory text	Title, quote/question, text	All living things are related; these genetic relationships can be charted on a tree of life. In this exhibit, you will meet plant, micro-organisms, and animals that live in Utah, and see them at different scales of life, where they have different stories to tell.	Life on Earth is diverse - from bacteria that live in deep sea vents to sagebrush in the Great Basin, to the migratory birds that fly over Great Salt Lake every year. Estimates vary, but there are more than 1.6 million known species of organisms. Life is also related - all living things share a common ancestor, and DNA. And life exists at different scales, from single-celled creatures invisible to the naked eye to towering redwoods hundreds of feet high. In this gallery we will explore these scales of life, and you will meet some of Utah's bacteria, plants, and animals.		
	LF1.E01.ip02	introductory text	Title, quote/question, text	The diversity of life plays out at the ecosystem level, as groups of organisms interact. We need to preserve this diversity to maintain the healthy ecosystems we all depend on.	An ecosystem is an area and all the micro-organisms, plants, and animals that live and interact there, as well as non-living elements (like soil or rocks). At this scale of life, populations of different living things interact in different ways. Energy enters ecosystems, and flows through them. The ecosystem is the broadest scale of life depicted in this gallery. You will see 4 of Utah's ecosystems, and some of the other scales of life as you explore this gallery.		key plants and animals highlighted in their habitats
	LF1.qt01-03	quote/question	quotes/questions on wall to Naturalist's Lab				
LF2 DNA, Amino Acids and Proteins			Visitors walk around and under a sculptural element depicting an unraveling DNA double helix.				
	LF2.si01	section intro		All life has DNA; DNA stores the instructions for building and reproducing organisms.	At this scale of life, we're deep inside cells, at the level of DNA, amino acids, and proteins. DNA is the underlying basis of inheritance. When DNA is copied errors, or mutations, can occur. You will see how DNA tells the cell how to construct proteins. We'll use the protein keratin as an example to show how important proteins are to us and other lifeforms.		
LF2.E01 DNA	LF2.E01.sx01	special exhibit	DNA/mRNA sculpture descending to the wall interactive				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	LF2.E01.ms01	mindset	Mindset text describes the role and components of DNA., with diagram of DNA; written as captions for the DNA sculpture.	DNA, or deoxyribonucleic acid, stores hereditary information in a code.	DNA, or deoxyribonucleic acid, stores hereditary information in a code made up of four chemical bases: adenine (A), guanine (G), cytosine (C), and thymine (T). The order, or sequence, of these bases determines the information available for building and maintaining an organism. DNA bases pair up with each other, A with T and C with G, to form units called base pairs. Each base is also attached to a sugar molecule and a phosphate molecule. Together, a base, sugar, and phosphate are called a nucleotide. Nucleotides are arranged in two long strands that form a spiral called a double helix. The structure of the double helix is somewhat like a ladder, with the base pairs forming the ladder's rungs and the sugar and phosphate molecules forming the vertical sidepieces of the ladder.		diagrams of DNA, protein synthesis
	LF2.E01.gc01	graphic caption	Captions for DNA replication diagram		An important property of DNA is that it can replicate, or make copies of itself. Each strand of DNA in the double helix can serve as a pattern for duplicating the sequence of bases. This is critical when cells divide because each new cell needs to have an exact copy of the DNA present in the old cell. Mutations, or changes in the DNA code, happen if errors occur in copying DNA.		diagram of DNA replication
LF2.E02 Building Proteins			Visitors help assemble the keratin amino acid sequence by matching messenger RNA puzzle pieces to the unraveling DNA strand past a strand of messenger RNA on an unraveled DNA helix, and see a keratin molecule strand being assembled. They play the keratin sequence game, following a "recipe book" to insert different amino acids at critical positions in the sequence, and see how readily proteins change.				
	LF2.E02.ms01	mindset	Mindset text explains protein synthesis and the roles of DNA and mRNA	The information in DNA is translated to make proteins, a key building block of cells. Proteins change readily, resulting in physical changes in an organism.	The process of making proteins is very precise. First, the DNA molecule unzips. One strand is the template for a strand of mRNA. (RNA is a nucleotide, like DNA, with a slightly different chemical structure). Then, the strand of mRNA goes outside the cell nucleus to the ribosomes. A ribosome is a complex of RNA and proteins where protein assembly takes place. The mRNA code sequence is matched to a complementary tRNA (transfer RNA) molecule. Each tRNA is linked to an amino acid, and as the mRNA is read off, the amino acids on each tRNA are joined together through peptide bonds, forming an amino acid chain. This chain is the basis of a protein.		diagram of protein assembly
	LF2.E02.in01	interactive	Protein synthesis game: Visitors match the mRNA puzzle pieces to the base pairs on the DNA strand	Visitors understand that DNA stores information that is translated into proteins.	•Visitors complete an amino acid chain, acting as transfer RNA to pair up an amino acid to the correct 3 base sequence (codon) on a strand of DNA. • Using a color-coded key, visitors pick from a bin of amino acid puzzle pieces. They match the 3 amino acids in sequence; when the chain is completed, it lights up. The lit chain extends to the Keratin Tree game. • Visitors are encouraged to detach the puzzle pieces and return to the bin.		
	LF2.E02.ap01	activity prompt	Prompt for protein synthesis game				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	LF2.E02.in02	interactive- amino acid sequence game	Keratin sequence game: visitors slide alpha keratin sequences from humans, pronghorn, and mountain lion back and forth to spot the differences. Beads represent different amino acids.	Visitors understand that mutations are inherited, and that genetic variation is one basis for building a tree of life.	Visitors pull a lever to select one of 3 highlighted positions on the keratin sequences. The 3 positions are noted by skill level (easy, medium, hard). In the easy position, most of the nodes have been "solved;" in the medium version no nodes are solved, but there is feedback at each node (lights up at correct selection); in the hard version, there is no feedback until all correct node selections have been made. • Once the position is selected, the end point amino acid letters switch to match it, and the first node (goat sheep) blinks, a cue to begin there. Visitors are asked to pick the amino acid present in the common ancestor (at the node). • Visitors touch a screen at the node to change the letter, stopping to indicate their choice. If they are correct, the portion of the tree to the right of the node and the end animals light up, and the next node on the tree blinks. • Working sequentially, visitors pick the amino acids at each node until the entire tree lights up.	pronghorn, mountain lion, human, pika, porcupine, and kangaroo rat	
	LF2.E02.ap02	activity prompt	Prompt for keratin synthesis				
	LF2.E02.fp01	focus panel	Focus panel text explains sequencing		Comparing proteins from different species gives us clues to their evolutionary relationships. If we find the same amino acid sequences in the same protein of different species, it means they inherited it from a common ancestor. Comparing the amino acid sequences gives us an idea of overall similarity, and allows us to pinpoint particular areas that are different. In proteins that serve the same function in dissimilar species small differences in the amino acid sequence will often not affect overall functioning of the protein molecule, but they can indicate evolutionary distance.		diagram/ illustration of sequencing
	LF2.E02.gi01	graphic image	images of keratin sequence animals		captions for animals		
LF2.E03 Keratin Investigation			Visitors discover that the protein that makes up our hair and nails, keratin, is shared with many other mammals. They study their own hair under a microscope, and touch keratin specimens. A case holds examples of keratin, some of which visitors can study in depth at touch and microscope stands.				
	LF2.E03.gi01-gi03	graphic images	Photos of keratin close-ups				
LF2.E03.gr01		graphic rail					
	LF2.E03.sx01	interactive-- keratin touch specimens	Table top with touch keratin specimens (elephant skin, fur, feathers); ideally same as microscope specimens; should be Utah key critters.				
	LF2.E03.ar01	artifact label	Label for keratin specimens				
	LF2.E03.ap01	activity prompt	Encourages visitors to touch the keratin specimens				
	LF2.E03.sx02	special exhibit- microscope	microscope w. keratin specimens, place for people to look at their hair, animal hair				
			Encourages visitors to look at their hair and nails and keratin samples under the microscope				

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	LF2.E03.ms01	mindset	Mindset text explains keratin's importance and where it's found	Keratin is a key structural protein that you have in your hair, skin and nails; other animals have it too, in claws, horns, and feathers.	Keratin is an extremely strong protein which is a major component in skin, and things that grow out of skin, such as hair, nails, hooves, horns, and feathers. The amino acids which combine to form keratin have several unique properties, and depending on the amounts of the various amino acids present, keratin can be inflexible and hard, like hooves, or soft, like skin. Most of your keratin is actually dead; hair, skin, and nails are all formed from dead cells which the body sheds as new cells push up from underneath.		photos of keratin items, diagrams of hair structure
	LF2.E03.ca01	case	Keratin specimen holds hooves, horn sheaths, feathers, turtle shells, fur, silk, rhino horn, lizard or snake skin and pronghorn antlers, dinosaur skin and claw impressions.			1. rhino horn A1048; needs to tip forward approx. 20 degrees 2. whale A1049, needs to rotate clockwise 90 deg. 3. hoofed mammals A1055, 1269 (needs to rotate to match reference skull image), 1270 (same orientation as 1055, either side or front), 1435, 1439, 1440, 1441 (match orientation of other horns/skulls) 4. carnivores A1438, 1437, 1420, 1421, 1422 5. rodents A1050, 1062, 1423, 1425, 1436 6. bat A1424 7. pangolin A1419 8. birds A1046, 1047, 1051, 1054, 1057, 1061, 1141, 1422, 1426, 1427, 1428, 1429, 1430, 1431, 1432, 1442, 1061, 1060 all bird logs should be beak down 9. reptiles A1052, 1053, 1056, 1433, 1434	illustrations of whale, antelope, hadrosaur
	LF2.E03.ms01	mindset	Mindset panel describes the variety of keratins.	Keratin is a versatile protein found in our nails and hair, and in horns, scales, and feathers.	Keratins are tough, fibrous proteins found in vertebrates. They form the hard outer structures of birds, reptiles, and mammals (think claws and scales). Look at the specimens in this case - each has keratin structures. Keratin can take many forms, as you can see, from the baleen in whales that filters microorganisms from sea water to the feathers and beaks of birds, porcupine quills and pangolin scales. Alpha keratins are softer and include fur, hair and wool; beta keratins are harder and include horns and scales.		
	LF2.E03.ar01-17	artifact labels	Labels for keratin specimens				
LF2.E04 What Keratin Does			At graphic panels with table top displays, visitors see 3 of the key Utah critters, and learn what keratin does through specific, intriguing stories (like pronghorn hollow hair). Visitors can pull out drawers at each critter to see specimens and graphics of all the forms of keratins in that critter (i.e. pronghorn antler, hoof, nose, skin).				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	LF2.E04.ms01	mindset	Mindset text describes structural proteins and their importance	Proteins are important molecules for all organisms and have many functions. Structural proteins are vital components of vertebrate bodies.	Structural proteins are fibrous proteins (with long string shapes as opposed to globular shapes). Keratins are the probably the most familiar fibrous proteins; they form the protective covering of all land vertebrates: skin, fur, hair, wool, claws, nails, hooves, horns, scales, beaks and feathers. Equally widespread, if less visible, are the actin and myosin proteins of muscle tissue. Another group of fibrous structural proteins are the silks and insect fibers. In addition, there are the collagens of tendons and hides, which form connective ligaments within the body and give extra support to the skin where needed.		photos of different keratin structures w. corresponding micrograph of keratin structure
	LF2.E04.ar01-	artifact labels	Labels for keratin examples				
LF2.E04.gr01			graphic rail				
	LF2.E04.sx01	specimen display- Keratin drawers	Specimen display in drawers			pinon jay and other bird feathers, pronghorn skin/hair sample, mountain lion claws and pawprint, gopher tortoise shell and isolated scutes. Additional keratin items from key critters to be selected; each will have color coded body diagram to indicate parts shown.	each specimen will have color-coded body diagram to indicate parts shown
	LF2.E04.fp01	focus panel	Focus panel text explains bird feather structural colors, illustrated by the pinon jay.	The blue color of a pinon jay comes from light scattering off the structure of the feather.	Bird feather colors can come from pigments (colored substances) or by structural color (light refracting off the structure of the bird's feathers). Some birds, like the pinon jay, have both structural colors and pigment colors. In feathers, blues and greens, and the shiny iridescent colors, are structural colors. Tiny air pockets in the barbs of feathers can scatter incoming light, resulting in a specific, non-iridescent color. Blue colors in feathers are almost always produced in this manner. What's the keratin connection? Bird feathers are made of keratin, so it's the keratin structure that makes the pinon jay blue.		photo of jay feather, wavelength diagram, diagram of feather
	LF2.E04.gi01	graphic image	photo of closeup of jay feather				
	LF2.E04.gc01	graphic caption			If you find the feather of a Blue Jay or Steller's Jay you can see for yourself how this works. First, observe the feather in normal lighting conditions and you will see the expected blue color. Next, try back-lighting the feather. When light is transmitted through the feather it will look brown. The blues are lost because the light is no longer being reflected back and the brown shows up because of the melanin in the feathers. (Cornell bird lab).		images of feather lit from front and back
	LF2.E04.fp02	focus panel	Focus panel text explains the structure of turtle shells, and how the gopher tortoise's shell helps it survive in the desert.	Keratin forms the hard scutes on the surface of desert tortoise shells.	Turtle shells are made of bone, covered by a layer of scutes, made from hard (beta) keratin. The scutes grow, laying down rings more or less annually, so you can estimate a turtle's age from the number of rings on the scutes. The shell helps protect desert tortoises from predators, and the outer keratin scutes are waterproof (for those occasional desert storms).		diagram of shell and scutes, photomicrograph of scutes, image of tortoise in desert
	LF2.E04.gi02	graphic image	photomicrograph of scutes				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	LF2.E04.fp03	focus panel	Secondary text explains mountain lion whiskers, and how they're used in hunting.	Whiskers help mountain lions feel their way, and detect and capture prey.	Mountain lion whiskers are long, thick stiff hairs. All mammal hair (even ours) is made of keratin. Keratin is a colorless protein that gives strength and stiffness to the hair. Mountain lions have whiskers, or vibrissae, on their lips, cheeks, chins, eyebrows, and forelegs that give them information about their environment. The whiskers are deeply embedded in the skin and connected to nerve endings that transmit information to the brain, so a cat can feel its way as it moves. They "read" air currents and the locations of obstacles and items around them, like grass and branches, in order to stalk almost silently. When capturing prey, the whiskers around the face all point forward like a net, to detect exactly where the prey is and where it might go. For a large prey, like deer, the whiskers tell the mountain lion where to bite the deer's neck to bring it down.		photomicrograph of whiskers, mountain lion hunting; diagram of hair structure
	LF2.E04.gi03	graphic image	photomicrograph of whiskers				
LF3 Cells							
	LF3.si01	section intro		Cells are the basic structural unit of life.	You are now at the cell organizational layer of life. You will see different kinds of cells, take them apart to learn about their parts, and see what cells can do. You have an estimated 100 trillion cells in your body! Your cells have many different shapes and functions. Did you know that some organisms have only one cell?		
LF3.E01 What are Cells			At this hands-on "cell workshop" visitors add parts to giant, diagrammatic cell frameworks to make animal or plant cells. As they correctly insert one of the cell organelle puzzle pieces, visitors receive feedback about the function of that part.				
	LF3.E01.gi01-gi03	graphic images	Close-ups of animal and plant cell images				
	LF3.E01.in01	Interactive - build a cell	Visitors understand that plant and animal cells have many similar elements, but key differences.		Visitors are invited to help build a cell. They select parts from the plant and animal cell bins, and try to insert them into the openings in the 2 cells. The animal parts and cell are "squishier" and the plant parts and cell more rigid. When a part is inserted in the right opening, the visitor hears feedback (now the cell can make more proteins!). Once all the cell components are inserted, the whole cell lights up, and visitors hit a reset so that the cell part pieces eject into a bin below.		annotated photomicrographs matching viewable cell types.
	LF3.E01.in02	Interactive - build a cell	Visitors understand that plant and animal cells have many similar elements, but key differences.				
	LF3.E01.ap01-ap02	activity prompt	Prompts for build a cell	Help us put the cells together.	Can you put the right parts in the plant and animal cells?		
	LF3.E01.ms01	mindset	Mindset text defines cells, explains the differences between plant and animal cells.	Cells are the basic functional unit of life. Plants, animals, and prokaryotes have different kinds of cells	All living things are composed of one or more cells. There are two main types of cells: prokaryotic and eukaryotic. Prokaryotic cells don't have a true nucleus and they tend to be smaller than eukaryotic cells. Bacteria and archaea have prokaryotic cells. Eukaryotic cells have a true nucleus, and have a more organized cytoplasm. Within eukaryotes, there are two main types of cells: plant and animal. They are similar, except plant cells have a rigid cell wall, which animal cells lack. Animal cells have lysosomes and centrioles, which plant cells lack.		diagrams and photos of plant and animal cells, prokaryote cells and organisms
LF3.E01.gr01		graphic rail					

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	LF3.E01.gc01-03	graphic caption	Captions for 3 cell types diagrams/photos				
LF3.E02 What Cells Can Do			Visitors see cells under the microscope, then watch the What Cells Can Do AV to see cells in action- dividing, making and using energy, photosynthesizing and communicating. Graphics and table top displays with microscopes explain how different cells in 4 of the key critters work.				
	LF3.E02.gi01-gi03	graphic image	Close-up of cell function images				
	LF3.E02.av01	av	Av shows mitosis and meiosis, cell communication, respiration and movement				
LF3.E02.gr02		graphic rail					
	LF3.E02.sx01	interactive	Microscope with different types of cells w. photos and diagrams of different cells.		standard prompt		
	LF3.E02.ms01	mindset	Mindset text explains cell functions and activities	Cells are alive and need energy. Cells move, grow, reproduce, make energy, and communicate	A cell has to carry out basic functions: molecule transport, reproduction, and energy conversion. Molecule transport The cell must be able to obtain nutrients and other molecules to survive. Reproduction Simply being able to sustain itself is not enough. Cells must be able to produce new generations. Energy conversion Cells have to carry out tens of thousands of chemical reactions, all of which need energy. Cells have developed highly efficient systems to make energy. Plant cells derive their energy from photosynthesis and animal cells rely on aerobic respiration to fulfill their energy needs.		
	LF3.E02.gc01	graphic caption	Graphic captions mitosis and meiosis	One of the things cells do is reproduce themselves.	Eukaryote cells can reproduce in two ways, mitosis and meiosis. In mitosis, the resulting daughter cell is an identical clone of the original cell. Mitosis is mostly used by body cells. Meiosis, however, is a form of sexual reproduction and only occurs in gametes (reproductive cells). The resulting daughter cells have different genetic information than their parent cells. suggest details as captions for diagram Mitosis Cell division begins with interphase, when the cell replicates all of its genomic and cytoplasmic material and prepares for division. After preparation is complete, the cell enters the 4-phased mitosis. In mitosis, the cell sequentially goes through prophase, metaphase, anaphase, and telophase. Immediately after the completion of telophase, cytokenesis is initiated to end cell division by literally separating the cell in two. Meiosis Meiosis starts with cells that have two sets of chromosomes from their parents. In meiosis the cell eventually forms four germ cells, each with half the chromosomes.		diagrams of mitosis and meiosis
LF3.E02.gr01		graphic rail					
	LF3.E02.sx02	interactive	Microscope w. Cell slides, including nitrogen-fixing bacteria, cancer cells, Rhizobium (microscope)				
	LF3.E02.ap01	activity prompt	standard prompt encourages visitors to use microscope				
	LF3.E02.ar01	artifact labels	Labels for bacteria, cancer cells, eye cells, other cells				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	LF3.E02.fp01	focus panel	Focus panel explains nitrogen fixing in Rhizobium	Bacteria transform nitrogen from the air so it can be used by plants.	All living organisms need nitrogen to make proteins, nucleic acids, and other compounds. The earth's atmosphere is almost 80% nitrogen, but living things can't use this form of nitrogen until it has been "fixed" (combined with hydrogen), to ammonia. Green plants, the base of most food chains, use this supply of fixed nitrogen to make proteins. But plants can't "fix" nitrogen, so where do they get their supply? Rhizobium is the best known species of a group of bacteria that symbiotically fix nitrogen. These bacteria enter the roots of leguminous plants, causing the plant to form lumps or nodules. Inside the nodules, the bacteria fix nitrogen, which in turn goes into the plant through the roots.		diagram of nitrogen fixing, photo of plant root nodules, photo of Rhizobium
	LF3.E02.fp02	focus panel	Secondary text explains cancer, and how cancer cells are different than normal cells.	Cancer is a term used for diseases in which abnormal cells divide without control and are able to invade other tissues.	Cancer is a class of diseases in which a group of cells grow uncontrollably, invade adjacent cells, and sometimes spread to other locations in the body. Cancer cells are different from normal cells in several ways. Cancer cells don't obey signals from other neighboring cells, and they don't become specialized, but stay immature. Nearly all cancers are caused by abnormalities in the genetic material of the transformed cells. As you have seen, the genetic material (DNA and RNA) controls how the cell reproduces and makes proteins, so if this material is damaged, the control of cell growth and reproduction may be affected.		diagram of cancer cells
	LF3.E02.fp03	focus panel	Secondary text explains mountain lion rod and cone cells.	For predators such as mountain lions, vision is an extremely important sense.	The vision of the Mountain Lion is one of the animal's most important adaptations for hunting. Mountain lions hunt in the evening and at night - how do they see their prey? The animal's eyes are quite large, and the retina contains more rods than cones, lending to the cat's excellent night vision. Although Mountain Lions cannot see in complete darkness, they can discern details in much lower light than humans. Rods and cones are specialized eye cells (we have them too). The retina is the back part of the eye that contains the cells that respond to light. These specialized cells are called photoreceptors. There are 2 types of photoreceptors in the retina: rods and cones. The rods are most sensitive to light and dark changes, shape and movement and contain only one type of light-sensitive pigment. Rods are not good for color vision. The cones are not as sensitive to light as the rods. However, cones are most sensitive to one of three different colors (green, red or blue).		eye diagram, image of magnified rods and cones, image of mountain lion eye
	LF3.E02.qt01-03	quotes/questions	Quotes/questions on back panel				
LF3.E03 Economy of Life			The Economy of Life exhibits tell the story of photosynthesis, the energy driver of most life on Earth. Visitors feel the heat of the sun, life's ultimate energy source, and see living plants and cyanobacteria.	Plants use photosynthesis to capture the sun's energy for use in ecosystems. Plant cells "bank" energy in the form of sugar.			
LF3.E03.gr01		graphic rail					

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	LF3.E03.sx01	special exhibit	Visitors see a large glass tank with living plants and algae (Elodea, Volvox, and a water lily), fueled by the heliostat. They watch as oxygen bubbles form on the Elodea leaves, indicating photosynthesis. Using a magnifier, they view the Volvox colonies swimming.				
	LF3.E03.ar01	artifact label	Label for Elodea				id photos for plants
	LF3.E03.ar02	artifact label	Label for Volvox				
	LF3.E03.ar03	artifact label	Label for water lily				
	LF3.E03.ap01	activity prompt	prompt encourages visitors to use microscope				
LF3.E03.fl01		family label	Family label for Volvox	Can you see the glowing spheres in the tank?	Each of those balls is a colony - a bunch of cells that live and work together. The cells swim together. They have eyespots, more developed near the "front" of the sphere, helping the colony to swim towards light.		volvox illustration and diagram
	LF3.E03.ms01	mindset	Mindset text describes photosynthesis and its critical role in ecosystems.	In photosynthesis, the beginning of energy's flow through life, plants capture the sun's energy in the form of sugars.	Plants and animals need energy to live, to grow, and to make more of themselves. The major source of energy for life on Earth is the sun, but we can't just absorb that energy and use it, it has to be converted into a form that we can use. Photosynthesis is the process that converts light energy into chemical energy. Living plants and some bacteria are able to use the energy from sunlight to produce sugar, which cellular respiration converts into ATP, the "fuel" used by all living things. This conversion process requires chlorophyll, the green pigment in plants, carbon dioxide and water, and produces sugar and oxygen. This process is arguably the most important biochemical pathway, since nearly all life on Earth either directly or indirectly depends on it.		photosynthesis diagram
	LF4.E01.qt01	quote/question	Quote/question on west wall opposite organisms				
LF4 Organisms							
	LF4.si01	section intro			You are at the organismal level of life's organization, where we are going to look at multicellular forms of life, whole plants and animals making their way in the world. Organisms need to find food, grow and reproduce. Their cells are specialized, and organized into tissues and organs that have different functions.		
	LF4.E01.ca02	case- Specimen display	Case holds plants, vertebrates and invertebrates demonstrating size ranges and limits; growth, and feeding adaptations.			specimens tbd	
	LF4.E01.ms01	mindset panel	Mindset panel describes the "problem of size"	Multicellular organisms can grow to large sizes, but need to solve structural and transport problems.	Single-celled organisms can only grow to certain sizes; at some point their surface area to volume ration prevents enough oxygen from diffusing into the cell. Multicellular organisms can grow to virtually any size because the cells integrate their activities and are permanently associated with one another. Multicellular organisms have specialized roles with different functions that act together to support and move the organism, and transport oxygen, food, and wastes. There are tradeoffs to being multicellular; the organism needs to coordinate growth and reproduction, as well as everyday functions like feeding. In this case you'll see some of the solutions multicellular plants and animals have evolved.		

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	LF4.E01.fp01	focus panel	Focus panel discusses limits of size	The sizes of organisms vary widely, from tiny shrews to giant redwoods.	A variety of influences place an upper limit to the size of organisms. One is the strength of biological materials. Sequoia redwood trees, some of which exceed 90 metres (300 feet), are apparently near the upper limit of height for an organism. The Italian astronomer Galileo calculated in 1638 that a tree taller than roughly 90 metres would buckle under its own weight when displaced slightly from the vertical (for example, by a breeze). Because of the buoyancy of water, large animals such as whales are not presented with such stability problems.		
	LF4.E01.fp02	focus panel	Focus panel discusses growth	Growth is a permanent, irreversible change in the size of an organism.	There are different types of growth. In allometric growth, different parts of the organism grow at different rates; this produces changes in size and form in the body. In isometric growth, the organs grow at the same rate as the rest of the body; there is no change in body shape and form. Some organisms have limited growth; they reach a certain size and stop growing. Others have unlimited growth; they continue to grow throughout their lifetimes. Metamorphosis is a biological process by which an animal physically develops after birth or hatching, involving a conspicuous and relatively abrupt change in the animal's form or structure through cell growth and differentiation. Metamorphosis is usually accompanied by a change of habitat or behaviour.		
	LF4.E01.ar02-	artifact labels	Labels for size diversity specimens				id photos
LF4.E01 Problem of Size			This exhibit introduces visitors to the challenge of being multicellular through interactives, text and viewing live animals. Visitors compare animals with internal and external skeletons, and see live tarantulas.				
LF4.E01.gr01		graphic rail					
	LF4.E01.ms01	mindset	Mindset text describes the problems of being large and multicellular (growth, food, oxygen, transport, waste disposal)	Being large poses similar problems for plants and animals - they need to find ways to support themselves and to transport food, oxygen, and wastes.	Imagine a single-celled organism the size of you - how could it feed itself and move around? It would be hard to absorb all the food and oxygen needed. A single-celled organism could never grow as tall as a redwood. Large multicellular organisms need to get energy, get rid of waste, and reproduce themselves. But the larger you are, the more complicated it can become. Take the redwood - it has to get water up 200 or 300 feet. And like large animals, the redwood has to support itself. The evolution of trunks and sturdy internal skeletons allowed plants and animals to become large. Insect size is limited by their endoskeleton.		illustration/ diagram of largest/ smallest plants, mammals, insects, compare to humans; insect trachea illustration; elephant skeleton
	LF4.E01.sx01	special exhibit	Live tarantulas and past molts, ideally showing growth; with small arthropod to compare.				
	LF4.E01.ar01	artifact labels	Label for tarantula		include comparison to smallest insect		

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	LF4.E01.fp01	focus panel	Focus panel text compares size limits of endoskeletons and exoskeletons.	Skeletons have to be strong enough for support, yet still allow animals to move.	The exoskeleton limits the possible size of the insect. The immense bulk that would be required in an exoskeleton strong enough to support an insect as large as a human being would pose insurmountable mechanical problems. This is certainly one reason why arthropods, as varied and successful a group as they are, have never even approached the size of most vertebrates. Further, rigid exoskeletons impose difficulties in overall growth, such as the periodic molting and deposition of a new covering that are necessary to permit increases in size. While not as drastic, endoskeletons also impose limits on size. Horses must have thicker bones than antelope, and elephants must have thicker bones than horses. The structural support and muscular mass required for large animals imposes constraints on size. It should come as no surprise that the largest vertebrates, the whales, are aquatic. The buoyancy of the water in which they live provides much of the support their great weight requires.	tarantula molts	illustration/ diagram of tarantula exoskeleton and largest mammal skeleton; illustration/diagram comparing tarantula to Paleozoic arthropod
	LF4.E01.ic01	inset case	Inset case with lupine specimen, large and small pine cones			lupine sheet; large and small pine cones	
	LF4.E01.fp02	focus panel	Focus panel text compares lupine and pine size (with laminated lupine plant and pine cones, bark, pine image)	Plants grow continuously, yet some are much taller than others - why?	Why can't a lupine grow as tall as a pine tree? Setting aside their genetic differences, lupine don't have the thick trunk a pine tree has. The multilayered trunk of a pine tree provides support, and a way to get water to the top of the tree. The outside layer of the tree is dead bark which provides protection from the environment. The inner bark layer is composed of live tissue that transports food downward. Between the bark and wood is the cambium layer which is responsible for increases in tree diameter (by creating annual rings) and responds to injury by producing callus tissue. The annual rings of wood are composed of large pores that carry water up to the leaves. Scientist used to think that older, taller trees' growth rates slows so much that they are essentially not growing. Recent studies, however, imply that the tree isn't growing because the top leaves and branches aren't getting enough water.		bark diagram, pine trunk cross section; illustration/diagram comparing lupine and pine size
LF4.E02 Reproduction and Development			Visitors see some of the "key critters" as eggs, juveniles and immature forms and adults and learn how they reproduce and develop.				
	LF4.E02.gi01-gi03	graphic image	Images of Reproduction and Development				
	LF4.E02.ms01	mindset	Mindset text explains reproduction and development.	Reproduction is a way to reshuffle information between generations.	Organisms produce offsprings similar to themselves through reproduction. Most multicellular plants and animals reproduce sexually. The different genetic contributions of two parents come together, forming a new genetic identity in the offspring. There is potential for a lot of genetic variability in this process, as different combinations of genetic contributions occur. This variability is what underlies evolution. A multicellular organism starts off as a single, fertilized egg or ovule. This single cell develops into a vastly complicated multicellular organism, with structures, such as limbs, and functions, such as respiration, all able to work correctly in relation to each other.		
LF4.E02.gr03		graphic rail					

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	LF4.E02.fp01	focus panel	Focus panel text contrasts asexual and sexual reproduction.	There are two main means of reproduction: asexual and sexual.	In asexual reproduction, an individual can reproduce without involvement with another individual of that species. The division of a bacterial Rhizobium cell into two daughter cells is an example of asexual reproduction. Asexual reproduction is not, however, limited to single-celled organisms. Most plants have the ability to reproduce asexually. Sexual reproduction requires the involvement of two individuals, typically one of each sex. Gopher tortoises reproduce in this way, with males doing battle for females.		diagrams, photos of asexual reproduction in Rhizobium; photo of gopher tortoises fighting for mates
	LF4.E02.fp02	focus panel	Focus panel text explains growth.		Organisms grow by increasing in size and complexity. Growth is the increase in size and mass during the development of an organism over a period of time. Growth occurs as cells divide through mitosis, then increase in size, and differentiate to perform specific functions, for example red blood cells in mammals and root cells in plants. All organisms grow, although the rate of growth varies over a lifetime. Typically, growth in an organism follows an S-shaped curve, in which growth is at first slow, then fast, then, towards the end of life, non-existent.		with growth series photos or illustrations of pinon jay or gopher tortoise
	LF4.E02.gi01	graphic image	Growth chart compares insect, human, and shell				
	LF4.E02.gc01	graphic captions	Captions for growth comparison diagrams.				
	LF4.E02.in01	pollination interactive	Visitors find that pollinators and the flowers they pollinate have co-evolved.		Visitors see 2 dials - one with flowers and one with pollinators. They turn the pollinator dial to match the pollinator to the flower and find that some flowers are pollinated by bats, others by wasps, and others by butterflies. When they make a correct match, a graphic congratulates them, and points out the co-evolved features of the plant and pollinator.		
	LF4.E02.ap01	activity prompt	Prompts for pollination game				
LF4.E03 Feeding and Fueling			Visitors will see skulls and jaws of different animals and learn how they feed. They can play the jaws game to see how different jaws work.				
	LF4.E03.gi01-gi04		Feeding and Fueling images				
LF4.E03.gr02		graphic rail					
	LF4.E03.ms01	mindset	Mindset text explains energy flow and feeding.	All organisms need energy, and have evolved different methods of feeding to fuel themselves.	Animals and plants need energy to move, grow, and reproduce. Plants make their own energy through photosynthesis. Animals can't make their own energy; they have to eat plants, or other animals. Carnivores like the mountain lion are meat-eating animals. There are two main types of meat-eaters: predators and scavengers. Predators actively hunt, kill and eat animals. Scavengers don't hunt or kill. They simply eat any animals that are already dead. Herbivores like the pronghorn or gopher tortoise eat plants. Humans, like other omnivores are adapted to eat both plants and animals.		

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	LF4.E03.in01	interactive- Jaw movement	Visitors understand that animals have evolved different shapes and configurations of jaws and teeth for different diets.		Visitors see a set of skulls; the skulls are flat, but dimensional, and lifesize; they include key Utah critters like pronghorn, mountain lion, desert tortoise. Graphics of the animal are adjacent to the skulls. Visitors manipulate the skulls and jaws to see how the animal chews.		
	LF4.E03.ap01	activity prompt	Prompt for jaw interactive	Move the jaws to see how different animals chew. Which are the planteaters, meateaters and omnivores?	Meat eaters have slicing teeth and jaws that move up and down to cut effectively. Omnivores eat meat and plants; they have some sharp teeth and some grinding teeth. Their jaws move up and down and side to side. Plant eaters usually don't have sharp canine teeth. Their jaws move side to side to grind tough plants.		
	LF4.E03.fp01	focus panel	Focus panel text describes how saprophytic fungi feed (w. Amanita model).		Amanita, a large, red mushroom with white spots, is the quintessential toadstool. Like other mushrooms, it is a saprophyte. This means that they feed on the dead remains of plants or animals, or on the waste materials (such as dung) of other living things. These fungi help to get rid of organic waste. They are often found in woodlands, where the floor is covered with massive amounts of dead plant material such as fallen leaves, twigs and logs. The digestion of such waste material is very important. Without this, the waste would pile up higher and higher into a permanent rubbish heap. Decomposers like Amanita are important recyclers of nutrients and energy, returning it to the soil where it can be reused by plants.		photo of fungus on a log
	LF4.E03qt01-03	quotes/questions	Quotes/questions on back wall				
LF7 Tree of Life							
	LF7.E01.ms01	mindset	mindset explains the tree of life	All living things are related; these genetic relationships can be charted on a tree of life.	Life on Earth is diverse. There are more than 1.6 million known species of life, from bacteria that thrive in Great Salt Lake, to sagebrush in the Great Basin, to the pelicans that nest on Gunnison Island. All this diversity is related, sharing a common ancestor, and DNA. This tree shows 3 major domains of life: bacteria, archaea, and eukaryotes. You (and other animals with backbones) are a eukaryote. Bacteria are single-celled microscopic organisms. The archaea are also single-celled microbes, but analysis of their RNA shows them to be very different from bacteria, and in fact more closely related to eukaryotes. You might know archaea as "extremophiles" - they live in extreme conditions like sulphur springs and deep sea vents. Highlighted on this tree are some of Utah's bacteria, archaea, and eukaryotes.		tree of life showing diversity of major groups over time
	LF7.E01.gc01-	graphic caption	Graphic captions call out common features of major groups		archaea features tk plants - chlorophyll, a green pigment that captures light from the sun, enabling plants to make energy in the form of sugar (photosynthesis) animals - multicellular, no cell wall vertebrates - jaws		images featured: DNA, jaws, 4 limbs, chlorophyll

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	LF7.E01.gc01	graphic captions	for endpoint organisms		brief captions for Utah-specific taxa	highlight animals include: nitrogen fixing bacterium Rhizobium,mycorrhizal fungus Amanita muscaria, Anabrus Mormon cricket, harvester ants, pronghorn Antilocapra, mountain lion Felis concolor, human Homo, pinon jay, desert tortoise Gopherus agassizii, stickleback fish, spruce or pine, lupine, yucca, bunchgrass Elymus elymoides	
	LF7.E01.gc02	graphic captions	Caption for animal tree				animal tree
	LF7.E01.gc03	graphic captions	Caption for plant tree				plant tree
LF5 Populations							
	LF5.si01	section intro		groups of similar individuals who tend to mate with each other in a limited geographic area. A population might be a field of flowers, or a pod of whales.	You are now at the level of populations in the scales of life. Populations are groups of organisms of one species in the same area. They interact with other populations of the same and different species, and they can become new species, under the right conditions. You will see species of stickleback fish and a population of harvester ants. Can you spot the different age groups of ants in the population?		
	LF5.gi01-gi05	graphic image	Images of Populations				
LF5.E01 What is a Population?			Visitors view a colony of harvester ants to understand the concept of a population. They observe different age and size classes of ants, and watch as they cooperate in foraging. They also see a tank of stickleback fish, and observe variation within a species.				
	LF5.E01.ms01	mindset	Mindset text explains the concept of a population.	Populations are members of a species in a given area; they vary, move, and sometimes become different enough to form a new species.	A population is a group of individuals living in the same area that interbreed. Populations are dynamic. Populations interact with other populations. They compete for resources and space. They eat each other. Populations vary in size over time and space. Populations may move to find resources or places to mate and raise young. Populations form communities, which in turn form ecosystems.		
LF5.E01.gr01		graphic rail					
	LF5.E01.sx01	special exhibit	Stickleback fish				
	LF5.E01.ar01	artifact label					
LF5.E01.gr02		graphic rail					
	LF5.E01.sx02	special exhibit	Visitors see a colony of live seed harvester ants, and note the different stages of growth and development of different individuals.				
	LF5.E01.ar02	artifact label	Label for harvester ants				
	LF5.E01.ar07	artifact label	Label for fossil ant in amber				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	LF5.E01.fp01	focus panel	Focus panel text explains the age/caste structure of the harvester ant colony.	Harvester ants live together in colonies of different ages and castes.	In nature, Pogonomyrmex harvester ants live in colonies with as many as 10,000 to 12,000 members, with each colony started by a single mother queen. Although workers and queens are all female, they differ considerably both anatomically and physiologically. Queens are much bigger, with an abdomen packed with ovaries. Queens also have wings at the beginning of their life, which allow them to fly off and mate. Once mated, they settle down, lose their wings, and produce working daughters who will tend broods. In early spring, the queens produce new queens and males. The males' only job is to mate, after which they die. Workers perform a variety of tasks, such as foraging, nest construction, and care of the brood. Larvae hatch from eggs and develop through several stages (instars). Larvae are white and legless, shaped like a crookneck squash with a small distinct head. They make cocoons to pupate.		photos/ illustrations of different ages and castes of harvester ants
	LF5.E01.ca03	case	Visitors see a cased display of corvids, lupines, and pinon, with phylogenies; the other side of the case houses specimens showing diversity and variability within metapopulations (chipmunks).				
	LF5.E01.ms01	mindset panel	Mindset panel explains metapopulations, and how the chipmunks demonstrate it.	A metapopulation is a "population of populations."	A metapopulation consists of a group of spatially separated populations of the same species which interact at some level. In this case you'll see a metapopulation of chipmunks; they look different but they are all members of the same species and can interbreed. The pelage or fur color of these specimens reflects clinal change (or "a gradual change in a character or feature across the distribution range of a species or population, usually correlated with an environmental or geographic transition.")	chipmunks	map showing locations of chipmunks; photo of habitats
	LF5.E01.gc01	graphic caption	Caption for map w. inset photos				
	LF5.E01.ms02	mindset panel	Mindset panel explains speciation and diversity in lineages.	New species arise when lineages split.	When populations become distinct enough, or separated by space or behavior such that they cannot interbreed, they become distinct species. This occurs when gene flow between the populations is very low or nonexistent, for instance when separated by a physical barrier. But speciation can occur sympatrically, as well, when the populations are not physically separate. Hybridization is a form of sympatric speciation. Frogs and corvids demonstrate allopatric speciation, where a physical barrier led to speciation. Speciation is a lineage-splitting event that produces two or more separate species. We plot these lineages on evolutionary trees; the branching points represent speciation events.		corvid tree, lupine tree, pinon tree,
	LF5.E01.gc02	graphic caption	Caption for corvid tree		Note: tree captions should address form of speciation that occurred in that group		
	LF5.E01.gc03	graphic caption	Caption for lupine tree			corvids: A2783-86, A2818, A2788-90, A2792, A2793	
	LF5.E01.gc04	graphic caption	Caption for frog tree				
	LF5.E01.gc05	graphic caption	Caption for pinon tree				
	LF5.E01.ar03	group label	Group label for corvids			A2810-18	
	LF5.E01.a04	group label	Group label for lupines				
	LF5.E01.ar05	group label	Group label for frogs				
	LF5.E01.ar06	group label	Group label for pine specimens				
	LF5.E01.ar07	group label	Group label for chipmunks				

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LF5.E02 What Populations Do			Visitors see some of the key Utah critters, and learn what populations do. They interact with a digital map to see how populations are dynamic over space and time.				
	LF5.E02.ms01	mindset	Mindset panel describes what populations do, relates to map	Populations behave and interact in time and space, and populations evolve into new species; we can see this happening in Utah.	Populations adapt, migrate, or die as environments change. Populations occupy ranges, and sometimes move long distances over the year. Some ranges are small (if populations are only found in 1 region, they are endemic), others are very large. Populations meet populations of their species and other species. Some of these interactions involve competing for resources, or space, or mates. Populations vary - a chipmunk from one part of Utah may not look exactly like a chipmunk from another part of Utah.		
LF5.E02.gr01		graphic rail					
	LF5.E01.fp02	focus panel	Focus panel describes variation in stickleback fish.	pending genus/species identification			
	LF5.E01.ar02	artifact label	Label for skeletons				
LF5.E02.gr02		graphic rail					
	LF5.E02.in01	interactive	Map interface with time and space zooms; demonstrates ranges, population dynamics, and speciation. Map shows Pleistocene and today.				
	LF5.E02.ap02	activity prompt	Prompt for map	pending interactive development			
	LF5.E02.fp01	focus panel	Focus panel explains migration in the pronghorn.	Most animal migrations involve seasonal movements to an area for breeding and/or feeding.	Pronghorn—antelope like animals native to the United States—have followed the same migration routes through Wyoming's Greater Yellowstone region for more than 6,000 years. The animals' 100-mile (160-kilometer) seasonal journey is the longest land-mammal migration in the continental United States. need information on Utah pronghorn migration--we can look to Utah Fish and Wildlife for this. I think it's seasonal migration as food sources shift; the website of Utah Wildlife didn't have the specifics.		map of migration route, image of pronghorn migrating
	LF5.E02.fp02	focus panel	Secondary text explains phenotypic variation in a Utah population.		information pending UMNH		
	LF5.E02.fp03	focus panel	Secondary text explains competition in Utah bunchgrass.	Species may compete for resources, sometimes resulting in one species adapting or dying out.	In the Great Basin of the western United States of America, the invasive annual grass Bromus tectorum has extensively replaced native shrub and bunchgrass communities, but the native bunchgrass Elymus elymoides has been reported to suppress Bromus. Scientists studied the two grasses in Curlew Valley, Northern Utah. At this site, they found that the native bunchgrass did suppress Bromus. This relationship might be explained by competition between the two grasses involving a different resource or occurring in a different season. Efficient autumn soil moisture use by Elymus may help suppress Bromus. In competition plots, Artemisia (sagebrush) grown with Bromus were stunted relative to those grown with Elymus, despite equivalent above-ground biomass of the two grasses. Elymus physiology and function appear to play an important role in determining the composition of communities in Curlew Valley, by maintaining zones free of Bromus where Artemisia can grow. Overlapping resource use in three Great Basin species: implications for community invisibility and vegetation dynamics BOOTH Mary S. (1) ; CALDWELL Martyn M. (2)		photo of Curlew Valley, Bromus, Elymus

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	LF5.E02.fp04	focus panel	Focus panel text explains coevolution and symbiosis in doves, lice and bacteria.	Coevolution is the process in which two species affect each other's evolution.	Chewing lice are ectoparasites that live on the skin and feathers of birds and mammals. Hair is made of keratin, which is a tough, fibrous structural protein and difficult to digest. Some chewing lice have symbiotic bacteria. Researchers here at the University are studying these organisms to determine if the bacteria are helping digest the keratin, or contributing in some other way to the louse's nutrition, perhaps by supplying amino acids not found in keratin. http://darwin.biology.utah.edu/PubsHTML/PDF-Files/88.pdf	specimens tbd	micrograph of lice, bacteria; close up image of lice on feather
	LF5.E02.qt01-03	quotes/questions	Quotes/questions on back wall				
LF5.E03 Hominid Evolution			Visitors can touch cast fossils at the Hominid Evolution exhibit, and place them on their spots on the human evolution tree. They will learn the latest theories on human origins and about the University's breakthrough research in this area	Like all other living and extinct species, we humans evolved from other species.			
	LF5.E03.ms01	mindset panel	Overview of the latest theories on human evolution; focus is molecular and anatomical evidence				
	LF5.E03.sp01	story panel	From Kristen Hawkes				images tbd
	LF5.E03.fp01	focus panel	Focus panel discusses behavioral evidence for hominid evolution				
	LF5.E03.sx01	special exhibit	Display of cast skulls				
	LF5.E03.ap01	activity prompt	Encourages visitors to place skulls on spots on evolution tree				
	LF5.E03.qt01	quote/question	Quotes/questions on west wall				
LF5.E04							
	LF5.E04.gr01	graphic rail	Overlook from LF to LD		links FP to Plate Techtonics		
LF6 Ecosystems			Visitors see Utah's ecosystems (hot desert, cold desert, montane forest and alpine) through dioramas, audio, and timelapse videography. They encounter the key plants and animals, this time at ecosystem scale and how they interact with other living things.				
	LF6.si01	section intro		Utah's living systems vary according to elevation and latitude. The diversity of elevation and landscape leads to an amazing diversity of ecosystems over a relatively small geographic scale.	You are now at the level of ecosystems in the organization of life. Populations live and interact in ecosystems. Natural ecosystems are made up of non-living factors (air, water, rocks, energy) and living factors (plants, animals, and microorganisms). Energy flows through ecosystems, from plant producers to consumers to decomposers. Here you will see recreations of 4 of Utah's ecosystems, and discover the players in each.		
LF6.E01 Hot Desert-Mojave			Visitors see a diorama representing the Beaverdam Wash area of southwest Utah, and learn how the extremes of heat and water availability affect the animals and plants that live in deserts. Visitors see up close the interdependencies of this ecosystem (cryptobiotic soils, plant and insect pollination) and appreciate its fragile nature. Use of lighting and scrims show night time inhabitants vs. daytime inhabitants, as well as sunset/ sunrise.				

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	LF6.E01.ms01	mindset	Mindset text describes the hot desert (elevation, rainfall, climate) and its inhabitants.	Desert animals and plants have functional and behavioral adaptations to high heat and low water availability.	Deserts are dry, receiving less than 10 inches of rain/year. Utah has 2 deserts: the hot Mojave and the cold Great Basin desert. In the Mojave, summer air temperatures can reach as high as 115 degrees, and the ground can be 140 degrees. In Utah, the hot desert occurs at elevations between 2500 and 3500 feet. You might think that animal and plant life in the desert would be sparse, yet life thrives in the desert. Plants and animals adapt to allow them to live in these extreme conditions.		with ecosystem location map
	LF6.E01.gi01	graphic image	Graphic images of the hot desert in day and night, and the four seasons		image captions		
LF6.E01.gr01		graphic rail					
	LF6.E01.gc01	graphic caption	Graphic captions describe hot desert interactions				diagram of ecosystem interactions (foodweb).
	LF6.E01.fp01	focus panel	Focus panel text explains yucca pollination.	Yucca are only pollinated by yucca moths.	Most plants have several pollinators. One-to-one matches between plant and pollinator species are rare. Utah is home to a case of tight coevolution in pollination systems: the yucca and yucca moth. Yucca are pollinated only by yucca moths, and 70% of yucca moth species visit flowers of only one yucca species. A female moth has special mouth parts (tentacles) for collecting pollen. She balls up the pollen and stores it under her head. The pollen is sticky and clings as she flies between yucca plants. She reaches a fresh flower and actively packs the pollen on the stigma, pollinating the yucca. Then, she moves to the flower base and lays her eggs in the yucca ovary. Finally, she climbs up to the anthers and collects pollen, ready to repeat the process in a new flower.		photo of yucca moth in yucca flower
	LF6.E01.sp01	story panel	Story panel from botanist - Mitch?				
	LF6.E01.gc02	graphic captions	Caption text explains plant adaptations		Desert plants use different strategies to "beat the heat." Cholla cactus uses CAM photosynthesis; in this variation of photosynthesis, the small holes on leaves are closed during the day to prevent evaporation. This precludes photosynthesis since CO_2 can't get into the plant. When the tiny pores open at night, the plant stores CO_2 for photosynthesis the following day. Many desert plants can store water. Called succulents, these plants store water in their fleshy leaves, stems or roots. Another strategy desert plants use is called drought dormancy. This strategy allows plants to survive periods of drought by conserving water through reduced metabolism. During this process (also called idling metabolism) the plant slows its metabolism down by recycling CO_2 and using stored water, just enough to keep the plant alive. Waxy or oily coatings that many plants have on their leaves and stems is another way that plants retain water. Creosote and jojoba are two examples of this. These waxes and oils, which are shiny, also reflect light and reduce the		CAM photosynthesis diagram, succulent photos, photos of desert plants w. waxy coatings

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	LF6.E01.fp02	focus panel	Focus panel text explains cryptobiotic soil	Soil crusts are important members of desert ecosystems and contribute to the well-being of other plants by stabilizing sand and dirt, promoting moisture retention, and fixing atmospheric nitrogen.	Cryptobiotic soils, or biological soil crusts are formed by living organisms and their by-products. They creating a crust of soil particles bound together by organic materials. In arid regions, these living soil crusts are dominated by cyanobacteria, but also include lichens, mosses, green algae, microfungi. Because of their thin, fibrous nature, cryptobiotic soils are extremely fragile systems. A single footprint or tire track is sufficient to disrupt the soil crust and damage the organisms. While some species within the soil crust system may regrow within a few years of a disturbance, the damage to slow-growing species may require more than a century before the delicate soil returns to its former productivity.		cryptobiotic soil photo, cryptobiotic soil diagram w. components identified, photo of damaged cryptobiotic soil
	LF6.E01.gc03	graphic captions	Caption text explains animal adaptations		Like desert plants, desert animals have strategies to survive in the dry heat. Many desert birds are active during cool early morning and evening hours, resting in the shade during the day. Some lizards, including collared, zebra-tailed and leopard lizards, have long legs and toes that lift their body high off the ground and reduces the amount of heat they absorb. Sidewinders stay cool by moving sideways. This sideways movement results in only two short portions of their bodies touching the scorching sand at any one time. A variety of desert animals, including rodents, kit foxes and tarantulas, escape the high temperatures by burrowing below the surface of the ground. When the temperatures drop at night, they come out to hunt. Desert tortoises retreat to long, underground burrows they've dug to escape the summer heat. (hot and cold desert info largely from Utah's Desert Dwellers, Utah Div. of Wildlife Resources, by Diana Vos)		photo of sidwinder, rodent and tarantula burrows, desert bird in shade
LF6.E01.id01		id label	id graphic panel has photo/illustration of featured inhabitants, plus captions about each				photo illustration of featured inhabitants
	LF6.E01.sx01	special exhibit-Ecosystem	Diorama; foreground species include: cryptobiotic soil cholla cactus with insect trap close-up, cactus wren and nest creosote bush barrel cactus wood rat home w. woodrat gopher tortoise model eating cactus antelope ground squirrel in burrow banana yucca w. yucca moth annual lupine desert moss creosote lac insect ground cross section showing: tarantula in burrow, tarantula and tarantula hawk in hole, desert raven w. pecked juvenile gopher tortoise shell coyote or kit fox chasing desert kangaroo rat (shown in mid leap) pallid bat eating a scorpion		Close up/ magnify: cryptobiotic soil, cholla cactus and flower, yucca flower and moth, lac insect on creosote, Very nearground: tarantula and tarantula hawk. Cutaway: Antelope ground squirrel in burrow. Nearground: pallid bat eating scorpion, raven and gopher tortoise shell, wren nest in cholla, lupine, desert moss.		
	LF6.E01.pm01	background photomural	Photomural of Beaverdam Wash showing Joshua tree, creosote bush		caption for photomural		

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	LF6.E01.av01	av- Nature's Sounds- Audioscape			The hot desert ecosystem is represented by a night scene of the Mojave Desert at Beaverdam Wash in Southwest Utah. The background sounds here might include wind across the soil and in leaves of Joshua tree or creosote bush. The foreground sounds of coyote yipping, owl calls, raven calls, coyote brushing against a creosote bush, rodents chewing or scurrying punctuate the stillness. This is a quiet ecosystem, you need to listen hard to pick up the subtle noises of the desert.		
	LF6.E01.sx02	special exhibit- Magnifier for Cryptobiotic Soil			standard prompt		
LF6.E02 Cold Desert			Visitors see a diorama representing a valley/foothill gradient in the Bonneville Basin. They learn about the plant and animal species that live here.				
	LF6.E02.ms01	mindset	Mindset text describes the cold desert (elevation, rainfall, temperature) and its inhabitants.	Plants and animals have adapted to the extremes of hot and cold in the cold desert. New, incoming species can displace desert species and disrupt ecosystems.	The temperature ranges in cold desert biomes are extreme. The Great Basin area is one of the few deserts on the planet where the temperature often falls below freezing. It is cold enough in the Great Basin desert to snow in the winter. The Great Basin Desert in Utah has long periods of cold weather and somewhat higher precipitation than other deserts (10-20 inches). Summers are long, with hot days and cool nights. Animals tend to seek the shade of desert plants during hot summer days.		map of ecosystem location
	LF6.E02.gi01	graphic image	Graphic images of the cold desert in day and night, and the four seasons		image captions		
LF6.E02.gr01		graphic rail					
	LF6.E02.gc01	graphic caption	Accompanies diagram of ecosystem interactions (foodweb)				diagram of ecosystem interactions (foodweb)
	LF6.E02.fp01	focus panel	Focus panel text explains invasive cheat grass and potential biological soil crust control.	Invasive plant species can take over from native plants;biological soil crusts may make it difficult for some invasives to take root.	Open, arid spaces in Utah's cold deserts are usually covered by a biological soil crust or biocrust, a highly specialized community of cyanobacteria, mosses, and lichen. This soil crust creates a micro-topography of minibumps, with microsites suitable for the seeds of native plants to germinate. The larger seeds of cheat grass have difficulty germinating on this surface; without drill-like awns, their seeds can't penetrate the dense biological soil crust.		images of cheatgrass, cryptobiotic soil
	LF6.E02.gc02	graphic captions	Caption text explains plant adaptations.		The name 'pickleweed' comes from the pickle-like appearance of its stem segments and its salty taste. Those "pickles" are fleshy parts of the stem where the plant stores dilute water. Pickleweed leaves are waxy on the outside, which keeps water from evaporating from the plant. Shadscale has several strategies for life in the cold desert. Tolerance to drought is achieved through partial shedding of leaves; this reduces water loss during severe moisture stress (a boon for the chisel-toothed kangaroo rat, whose diet is primarily shadscale leaves). The plant deposits excess salt on its leaves, which has the added benefit of increasing the reflectivity of the leaves, so less of the sun's heat is absorbed.		images of pickleweed and shadscale

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	LF6.E02.gc03	graphic captions	Caption text explains piñon and juniper encroachment.		Pinyon and juniper woodlands have expanded 10 to 30% in the past 30 years and now occupy nearly 20 million hectares of sagebrush shrub steppe in the Great Basin Region and Colorado Plateau. Under natural conditions western juniper remains in balance with sagebrush, grasses, wild flowers and sedges in the Great Basin. Historically, individual trees were found clinging to rocky ridges where they were spared by periodic wildfire. However, decades of livestock grazing, fire suppression and other factors have created conditions that scientists believe have contributed to the rapid and unnatural spread of western juniper down from the hilltops and across sagebrush basins. The introduction of these trees upsets ecosystem relationships, and may increase erosion and runoff, as well as the chance of catastrophic fire, as shrub layers disappear.		maps or aerial photos showing pinon juniper distribution in 1950 and 2000
	LF6.E02.fp02	focus panel	Focus panel text explains sage brush as a keystone species.	Sagebrush is a keystone species in the Great Basin	In the Great Basin, sagebrush provides food and cover for many plant-eating animals, including sage grouse and pygmy rabbit. Utah might have lost as many as 1 million acres of sagebrush. The chief threat to sagebrush is invading cheatgrass; cheatgrass is prone to catastrophic fires. The expansion of pinyon-juniper woodlands into sagebrush habitat and other human impacts, such as overgrazing by livestock are also major sources of concern. Loss of sagebrush impacts the species that depend on it. It is estimated that Greater Sage-Grouse occupy only 41.4 percent, and Gunnison Sage-Grouse occupy only 30.7 percent, of the habitat they once did (Beck et al. in press).		images of sagebrush and species that depend on it; map or aerial photo showing extent of sagebrush in Utah in 1930? And today
	LF6.E02.sp01	story panel	Story panel from birder who visits the cold desert				
LF6.E02.id01		id label	Graphic id panel has photo/illustration of featured inhabitants, plus captions about each				
	LF6.E02.sx01	special exhibit-Ecosystem	Diorama; foreground species include: pinon pine juniper pickleweed iodine bush shadscale cheat grass Russian thistle sagebrush w. broomrape Mormon cricket feeding on saltbush or sagebrush harvester ant hill section showing ants, ants being eaten by shorthorned lizard on top Western spadefoot toad in burrow piñon jay distributing seeds broad-tailed hummingbird pygmy rabbit hiding under sagebrush chisel-toothed kangaroo rat eating shadscale pronghorn stepping into diorama mule deer coyote hunting pygmy rabbit male sage grouse posturing		Close up/ magnify: shadscale leaves. Very near ground: Mormon cricket, soil cutaway w. harvester ant nest, spadefoot toad in burrow. Nearground: shorthorned lizard eating ants, sage and broomrape, rabbit, shadscale and rat, sagegrouse, pinon jay, hummingbird and paintbrush, pickleweed. Midground: pinon, cheatgrass, thistle, pronghorn, mule deer, coyote, (include tracks) Background: pinon, juniper. Interactions: Mormon cricket feeding on saltbush or sagebrush harvester ant hill section showing ants, ants being eaten by shorthorned lizard on top Western spadefoot toad in burrow piñon jay distributing seeds broad-tailed hummingbird pygmy rabbit hiding under sagebrush chisel-toothed kangaroo rat eating shadscale pronghorn stepping into scene		

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	LF6.E02.pm01	photomural	Background photomural of Cedar Valley or Fish Springs showing big sagebrush, two-needle piñon, Utah juniper, greater sage-grouse, pronghorn.		photomural caption		
	LF6.E02.av01	av- Audioscape			The cold desert ecosystem, represented by the Great Basin at Cedar Valley or Fish Springs, is also relatively quiet. The background noises are like those of the hot desert, with sagebrush, pinon, and juniper instead of creosote bush. Visitors might hear the chirp of Mormon crickets, the movement of shorthorned lizards, the call of a spadefoot toad, the cry of pinon jays, the display of a male sage-grouse, the sound of pronghorn hooves, the scurrying and chewing of a chisel-toothed kangaroo rat, and the hopping of a pygmy rabbit. A sudden thunderstorm disturbs the stillness.		
	LF6.E02.sx02	special exhibit	Magnifier for microfungi		standard prompt		
LF6.E02.fl01		family label	Family label about Mormon cricket	Can you see the Mormon cricket?	Technically, it's a katydid, not a cricket. In the Great Basin, this big bug eats sagebrush and saltbush. Mormon crickets migrate up to 50 miles a year! On this trek, they may eat food crops like alfalfa and vegetables.		
	LF6.E02.qt01	quotes/questions	Quote/question on back wall				
LF6.E03 Montane Forest			Visitors see a diorama representing a forested canyon on the Wasatch Front and learn about the interconnections of the plants and animals.				
	LF6.E03.ms01	mindset	Mindset text describes the mountain forest (elevation, rainfall, climate) and its inhabitants.	Changes in elevation and moisture affect the plants and animals that live on mountain slopes.	Utah's montane forests are found at elevations of 6000 to 9000 feet. Trees prefer northern and eastern aspects. The mountains have more rainfall than the warmer plains and foothills below; about 20 to 25 inches of rain and snow fall each year. This helps many shrubs, vines, and berries to grow in the understory of taller trees. Often the understory is very grassy with smaller trees, such as Gambel's oak, and shrubs growing in the open areas. Wildlife that makes their homes here include Steller's jays, boreal toad, Western garter snake, and elk.		ecosystem location map
	LF6.E03.gi01	graphic image	Graphic images of montane forest in day and night, and the four seasons				map of Utah showing montane forest areas
LF6.E03.gr01		graphic rail					
	LF6.E03.gc01	graphic caption	Accompanies diagram of ecosystem interactions (foodweb)				diagram of ecosystem interactions (foodweb)
	LF6.E03.fp01	focus panel	Focus panel text explains trees/woodpeckers/boring insect interactions.	Woodpeckers help protect trees by eating boring insects.	Woodpeckers drum on trees to claim territory and attract a mate. They drill into trees to search for food and hollow out a nesting or roosting cavity. Woodpeckers use their chisel-like bills and strong neck and head muscles to chip away bark and wood to uncover insects. Their extremely long, barbed tongues (some species are able to extend their tongue two inches beyond the bill tip) can spear insects hidden deep in small holes. Scientists have estimated that one black-backed woodpecker may eat 13,500 beetle larvae annually. In some areas, woodpeckers are thought to be able to eat enough larvae to prevent outbreaks of insects that damage and kill trees. In addition, while the birds feed, they remove bark and expose the remaining insects to the elements.		woodpecker on tree photo, photos of woodpecker eating boring beetles/larvae

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	LF6.E03.gc02	graphic captions	Caption text explains plant adaptations.		Some plants have adaptations to reduce damage from planteaters, and even to repel them. Plants use of chemical or mechanical defenses, such as toxins that kill herbivores or reduce plant digestibility (also called antibiosis). Plant toxins are organic compounds that are often by-products of the plant's metabolic activities. Gamble oak shoots contain tannic acids, which inhibit herbivore digestion by binding to consumed plant proteins and making them more difficult for animals to digest, and by interfering with protein absorption and digestive enzymes. If sheep or cattle eat enough of the shoots, they become ill. Producing toxins helps the young Gambel oak escape being eaten and survive to become a tree.		Gambel oak, Gambel oak shoots
	LF6.E03.gc02	graphic captions	Caption text explains mule deer seasonal energetics and movement patterns.		Mule deer are selective feeders, and rarely concentrate on any single species. Feeding habits vary with the changing seasons, and many researchers believe that mule deer have the ability to pick and choose the plants with the highest nutritional value during each season of the year. From late spring to early fall, mule deer quickly gain weight and build up fat reserves by feeding heavily on succulent leaves of the plentiful forbs and grasses. In late fall, they feed primarily on the current year's growth of leaves and stems of brush species. During the winter and early spring when there is little ground forage available, mule deer are on a starvation diet of branches. This dry, woody vegetation is difficult to digest and lacks enough nutritional value to maintain body condition. During these periods of inadequate nutrition, mule deer use stored body fat to survive. Mule deer living in areas of high snowfall, like Utah's mountains, or in areas with drastically changing climates, like Utah's deserts, will make seasonal migrations between winter and summer ranges. Generally, mule deer summer at high elevations and winter at low elevations, following the snow line. During heavy winters, migrating deer will often move into cities and towns in their search for food. Often this causes problems as the deer eat ornamental shrubs and fruit trees in an attempt to survive. (from http://wildlife.utah.gov/publications/pdf/muledeer.pdf)		photo of mule deer in montane forest, photo of mule deer on U of U campus

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	LF6.E03.fp02	focus panel	Focus panel text explains boreal toad threats (chytrid fungus, link to keratin).	Utah's boreal toads are declining; one factor may be chytrid fungus.	The population of boreal toads has declined dramatically over the past 25 years. The decline has been attributed to several possible causes. These include: increased UV radiation, acidification of water, water borne toxins, heavy metal contamination, habitat disturbance, and most recently a pathogenic chytrid fungus called batrachochytrium dendrobatidis. The Utah Wildlife Action Plan recognizes this latest threat and recommends researching the causes of the boreal toad decline in the state as well as restoring and protecting habitat. The Chytrid fungus only attacks the parts of a frog's skin that have keratin in them. Most of frog skin doesn't have keratin - they need to have breathable skin to absorb oxygen from the air. Frogs only have keratin in the parts of their body that get exposed to wear and tear - such as their hands and feet, and the places where their legs rub against their bodies. An infected toad may die, but not until after it's hopped around, spreading the fungal spores. Once a pond has become infected with Chytrid fungus, the fungus may stay in the water forever.		photo of healthy boreal toad, photo of chytrid fungus on boreal toad.
	LF6.E03.sp01	story panel	Story from Eric or Becca				
LF6.E03.id01		graphic id label	Graphic id panel has photo/illustration of featured inhabitants, plus captions about each				photo illustration of featured inhabitants
	LF6.E03.sx01	special exhibit-Ecosystem	Diorama; foreground species include: decomposing log w. shelf fungus Rocky Mountain maple wild flowers spruce aspen w. fungus lupine oak and maple galls maple seeds in the air and on the ground boreal toad Western garter snake eating boreal toad?? Steller's jay on tree feeding Western spruce budworm spruce tree with spruce bark beetles, three-toed woodpecker eating beetles elk dropped rack badger digging after pocket gopher snowshoe hare pine marten and tree squirrel red squirrel on log holding cone Uinta chipmunk on ground, in grass		Diorama; foreground species include: decomposing log w. shelf fungus Rocky Mountain maple lupine oak and maple galls maple seeds in the air and on the ground boreal toad Western garter snake eating boreal toad?? Steller's jay on tree feeding Western spruce budworm spruce tree with spruce bark beetles, three-toed woodpecker eating beetles mountain lion chasing mule deer into scene red squirrel on log holding cone Uinta chipmunk on ground, in grass mule deer fawn hiding		
	LF6.E03.pm01	photomural	Background photomural of steep canyon on Wasatch front showing Gambel oak, Rocky Mountain Maple, aspen, curlleaf mountain mahogany, sub-alpine fir, Engelmann spruce		photomural caption		

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	LF6.E03.av01	av- Audioscape			The montane forest ecosystem is represented by a community on the Wasatch front. Visitors hear the wind in oak, maple, fir, spruce, alder, and aspen trees. Leaves rustle and crunch as mountain lion or elk go by. Visitors hear the call of a boreal toad, the cry of a Steller's jay, the slither of a Western garter snake over the ground, the chewing as a red squirrel eats, Uinta ground squirrel chirping "song," the calls and pecking of a three-toed woodpecker, and the scolding of a red squirrel.		
	LF6.E03.sx02	special exhibit	Magnifier for fungi		standard activity prompt		
	LF6.E03.qt01	quotes/questions	Quote/question on back wall				
LF6.E04 Subalpine-alpine			Visitors see a diorama representing a rock outcrop and associated tundra at the edge of the treeline and learn about the interconnections of the plants and animals, and how they are adapted to life at extremes of elevation and low temperatures.				
	LF6.E04.ms01	mindset	Mindset text describes the alpine ecosystem and its inhabitants	On mountain tops, there is nowhere to run - species adapted to life here are vulnerable to climate change and invading species.	Between 9,500 and 11,500 feet above sea level lies the Subalpine Life Zone. This is the most humid life zone, since it is covered with snow six to nine months each year. Rain and snowfall can be 30 to 60 inches a year. That leaves only about two months for tree seedlings to sprout and flowering plants to produce flowers and seeds. The major plant community in this zone is the Englemann spruce and subalpine fir forest. Shade from the forest and cool temperatures help keep snow on the ground until late spring. Trees, and other plants growing here, tend to be smaller than those growing in the zones below. Growing closer to the ground helps protect them from the harsh winds. The highest life zone in Utah is the arctic-alpine tundra. Above timberline, this life zone ranges from 11,500 feet to more than 12,000 feet in elevation. This is the wettest and windiest life zone. (from http://www.wildlife.utah.gov/projectwild/magazine/life_zones.pdf; note, from the species list, this seemed like it was more subalpine than alpine)		ecosystem location map
	LF6.E04.gi01	graphic image	Graphic images of Alpine region in day and night, and the four seasons		captions for images		
LF6.E04.gr01		graphic rail					
	LF6.E04.gc01	graphic caption	Accompanies diagram of ecosystem interactions (foodweb)				diagram of ecosystem interactions (foodweb)

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	LF6.E04.fp01	focus panel	Focus panel text explains threats from climate change.	Humans are speeding up the rate of global climate change; mountaintop ecosystems are particularly vulnerable.	Over the past 150 years, humans have increased the “natural” rate and quantity of greenhouse gasses cycling from the Earth into the atmosphere. Increased greenhouse gases cause air and ocean temperatures to increase, and alter atmospheric pressure, air and water circulation, and the transport of heat and precipitation between low and high latitudes. This, in turn, changes the Earth's historic climate patterns, leading to extreme weather that is difficult to predict. Increased temperature has been documented in Utah - 0.69 degrees between 1940 and 1996. Among other impacts, climate change is expected to induce accelerated extinction. General climate models predict that as temperatures increase, vegetation will shift upslope and mountainous wilderness will lose the highest and coolest climatic zones at the top of climate zones shift upward, the habitat on top of the peaks becomes smaller and smaller, putting more spatial and genetic pressure on species populations there. Where will the alpine species go?		
	LF6.E04.gc02	graphic captions	Caption text explains plant adaptations.		Plants in the Alpine ecosystem have adaptations to extreme cold and harsh winds. Small plants often grow in thick little clusters. Among these “cushion-type” plants is the alpine forget-me-not, which grows close to the ground. The fierce winds stunt and deform trees into what is called Krumholtz formation (from German: krumm, "crooked, bent, twisted"; and Holz, "wood", also Knieholz "knee timber"). The wind off dries and kills branches on the windward side, giving trees a flaglike appearance. Intense winter cold, combined with permafrost, dwarfs these trees as it does every other plant. Alpine plants are perennials, slow growing, and long lived. The seeds of alpine plants must be viable for more many seasons in case conditions are not favorable for seed germination the year of production.		photo of alpine forget me not, photo of Krumholtz spruce, and normal spruce at lower elevations
	LF6.E04.gc03	graphic captions	Caption text explains animal adaptations.		Alpine animals need to survive cold harsh winters. Some, like the marmot, hibernate. The marmot spends the winter in its burrow, the entrance sealed, in a state of torpor (reduced body functions). Marmots emerge when the temperature at night gets warm enough. The pika has a unique adaptation. It sets grass during the warmer months and builds haystacks under sheltering rock so it has dried grass to eat in the winter months. If you are a brown animal, how do you hide in winter when the world is white? Animals like the snowshoe hare and the ptarmigan solve this problem by shedding their summer brown fur or feathers, and growing a coat of winter white.		photo of marmot ideally in burrow, photo of pika and haystack, photo of winter and summer ptarmigan and snowshoe hare
	LF6.E04.fp02	focus panel	Focus panel discusses Whitlow grass.				photos of Draba
	LF6.E04.sp01	story panel	Story panel from climber discussing alpine habitat				
LF6.E04.id01		graphic id	Graphic id panel has photo/ illustration of featured inhabitants, plus captions about each.				photo/ illustration of featured inhabitants

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	LF6.E04.sx01	special exhibit-Ecosystem	Foreground species include: lichen bristlecone pine (Krumholtz) and cones sedge Whitlow "grass" Magdalena Alpine butterfly (group of 10? flying over rockslide) diptera tbd spiders tbd golden eagle threatening marmot Clark's nutcracker feeding on pine seeds Rufus hummingbirds eating out of a penstomen white-tailed ptarmigan foraging pika and haypile in talus dwarf shrew eating insect or spider in talus		Diorama; foreground species include: lichen bristlecone pine (Krumholtz) and cones sedge Whitlow "grass" Magdalena Alpine butterfly (group of 10? flying over rockslide) diptera tbd spiders tbd golden eagle threatening marmot Clark's nutcracker feeding on pine seeds hummingbirds white-tailed ptarmigan foraging pika and haypile in talus dwarf shrew eating insect or spider in talus		
	LF6.E04.pm01	photomural	Photomural of a rock outcrop and associated tundra at the edge of the treeline showing lichen, bristlecone pine, Engelmann spruce, mat willow, limber pine		photomural caption		
	LF6.E04.av01	av- Audioscape			The alpine ecosystem background should sound very windy. Strong harsh winds rattle in dwarfed pine and spruce, and whistle through sedge and Whitlow "grass." Visitors hear the cry of a golden eagle, a marmot alarm call, the rustle and chewing of a white-tailed ptarmigan as it looks for food, the sound of bighorn sheep hooves, pikas squeaking, and the occasional rattle of a rock fall.		
	LF6.E04.sx02	special exhibit	Magnifier for lichens		standard prompt		
	LF6.E04.qt01	quotes/questions	Quote/question on back wall				
LF6.E05 Human Interactions			Visitors wander through a series of story stations, where they meet individuals who are working to improve our interactions and relationships with the natural world. Inspired by the words of these scientists, activists, conservation biologists, educators, and writers, visitors add their own thoughts to a digital "talkback" station.				
	LF6.E05.ms01	mindset	Mindset panel reviews human interactions/leave no trace	Be mindful of your impact on the planet.	As we humans increase in number, and occupy more of the planet, and use more of its resources, we impact natural ecosystems. It's possible to minimize your own impact, at home and when you are in the outdoors. Do you travel lightly on the land, with minimal disturbance to the plants and animals that live there? Some of Utah's ecosytems are threatened by development and climate change, including wetlands and the cold desert. It will take cooperation and planning, and perhaps a change in our behavior and attitude, to save them.		
	LF6.E05.sp01	story panel	Story panel about conservation (aquaculture and fisheries or bee extinction)		Note: story panels should include multiple viewpoints		
	LF6.E05.sp02	story panel	Story panel about climate change				
	LF6.E05.sp03	story panel	Story panel about fire ecology				
	LF6.E05.sp04	story panel	Story panel about invasive species (cheatgrass or zebra mussel)				

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	LF6.E05.av01	av	Visitors wander through a grove of sound stations, listening to different people as they discuss their relationship to the natural world. Themed around "Leave No Trace," these voice recordings will inspire visitors to examine their own thoughts and feelings about nature and conservation. These individuals might include a ski resort owner, environmental activist, policy maker, poet or artist, and a biologist. Visitors hear differing points of view on nature, human interactions with the natural world, and sustainability. The speakers represent a diversity of Utahns.				
	LF6.E05.av02	interactive - talkback	Visitors are invited to "talk to us" and offered a menu that includes: join a blog-based discussion on sustainability and human interactions hosted by the UMNH website; view the population clock or respond to a "what do you think?" question about issues or "what do you do?" question about sustainability tips.				
	LF6.E05.ap01	activity prompt	Prompt for talkback				
LF7 Naturalist Lab							
	LF7.E01.gp01	graphic panel					
	LF7.E01.gp02	graphic panel					
	LF7.E01.gp03	graphic panel					
	LF7.E01.gc01-	graphic captions	Captions for field and lab notebook pages				

LAKE

Truly understanding GSL will change your relationship with this unique terminal lake, and inspire pride, wonder, and stewardship.
1. GSL, a hub of life, plays a critical role of hemispheric importance for millions of migratory birds.
2. GSL and its wetlands nourish and filter aquatic ecosystems and support the city's water cycle.
3. As a terminal lake, GSL holds the memory of every drop of water that ever entered it.
4. The lake is dynamic and changing; historic human impacts have dramatically altered the lake.

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			In the Great Salt Lake Observatory, floor and wall treatments make visitors feel that they are in the lake. From this perspective, they see migratory birds and wetland and shoreline dioramas, trace the water cycle through Salt Lake City's watershed, and explore human impacts through an AV program. At a large topographic lake model, visitors can go back in time to see what one of the larger precursor lakes looked like in the valley; at the window they can look through viewscopes to see out to these ancient shorelines.				
LK1	**Introduction**	title wall	Introduces the observatory title				
LK1.E01.gp01							
		exhibit intro	Salt precipitation grabber panel w. quote/question/fact; invites visitors to explore this amazing resource here at the museum and in the area		title quote or question or amazing fact www.yosemite.ca.us/john_muir_writings/steep_trails/chapter_8.html		
	LK1.E01.ip01	intro panel	Intro explains what visitors will see and do at intro panel and in exhibition	Great Salt Lake is a unique and amazing resource - it affects our weather, and supports millions of migratory birds. What you don't know about the lake will surprise you.	You're watching as salt crystals form - just as they do in the evaporation ponds around Great Salt Lake. In this exhibition, you will walk around the Great Salt Lake, see some of the amazing plants and animals that live in and around the lake, and explore the wetlands and shoreline habitats. Did you know that the lake's wetlands support millions of migratory birds? You will be able to recreate the past levels of the lake, and see its relationship to the water cycle. Finally, you'll see objects made by people who lived around the lake more than 10,000 years ago, and you'll hear from modern residents as they discuss the lake and its future.		
LK2 Great Salt Lake Ecosystem							
	LK2.E01 About the Lake		Visitors see the residents of the lake (micro and macro), hear the sounds of the lake and the shore, and smell the lake's characteristic odors. Visitors see the living micro-life of the lake's North and South arms displayed in glass tubes, and can examine the organisms in detail under microscopes. They will discover some of the plants and animals that live in the lake's wetlands and shoreline in full-scale dioramas, and can see for themselves how wetlands act as a sponge, holding and filtering water.				
Lake Floor	LK2.E01.sx01	special exhibit	Map of Great Salt Lake, past shorelines and surrounding areas imbedded in floor.		call outs include Antelope Island, Dolphin Island, Gunnison Island, Hat Island, Stansbury Island, Carrington Island, Fremont Island; Ogden, Weber, Bear and Jordan Rivers; past lakes (Provo, Bonneville, Gilbert, Stansbury), Great Salt Lake, and cities and towns (Delta, Nephi, Richfield, Park Valley, Wendover, Salt Lake City, Provo, Ogden, Tooele, Snowville, Logan, Milford)		map of GSL

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	LK2.E01.av01	av	GSL soundscape- Visitors can hear the soundscape at several points in the observatory: while standing on the lake map, in front of the wetlands diorama, and in front of the shoreline diorama. Ideally, the soundscape is slightly different in each area, so visitors get a sense of the variety of life (and sound!) of the lake.		The program has an ambient or background layer consisting of sounds like: waves hitting a shore wind blowing through marsh plants or over playa salt foam blowing at West Rozel Bay the beat of bird wings overhead rustling of small mammals through wetland plants Specific noises, include: dragonfly wings leopard frog calls bird calls: eared grebe, loggerheaded shrike, California gull, Wilson's phalarope, Northern harrier, American avocet, black-necked stilt, snowy plover, savannah sparrow, white pelican, white-faced ibis, yellow-headed blackbird, Northern shoveled, common golden eye, Western meadowlark, long-billed curlew tiger beetles moving over playa mosquito hum		
	LK2.E01.ap01	activity prompt (on si panel)	Prompt for walk around the lake	You can follow the outline of the lake, and the giant lakes that preceded it, on the floor.	{need to scale this activity to map) Take a walk around Great Salt Lake! The lake formed from an enormous freshwater lake tens of thousands of years ago- see if you can find its outline in the floor. The lake grew and shrank over time, you can walk around the different lakes and see how much the lake has changed. You can also walk in the lake - the pink part is the North Arm and the blue the South.		outline map of lake
LK2.E01.gp01 North Arm of the Lake		graphic panel					
	LK2.E01.si01	section intro	Section intro explains how the lake is Great (size), Salt (chemistry) and a terminal lake.	The Great Salt Lake holds the memory of every drop of water that's been in it.	The Great Salt Lake is the largest salt lake in the Western Hemisphere, and the 4th largest in the world. It's larger than the state of Rhode Island! Great Salt Lake is the remnant of freshwater Lake Bonneville, a great ice age lake. As the climate warmed and the lake shrunk, water evaporated, and the lake became salty. Although the Lake is "great, " it's only about 20' deep, so a rise in lake level can spread over a wide area, potentially causing flooding. Great Salt Lake is a terminal lake - no rivers flow from it. A causeway across the lake, completed in 1959, has effectively split the lake into 2 - a North arm and a South arm.		
	LK2.E01.ms01	mindset		The north arm of Great Salt Lake is saltier than the south arm; very few creatures can live under these conditions.	The north arm of GSL is an extreme environment. Two kinds of bacteria do thrive in the north arm: Halococcus and Halobacterium (halo means salt). Some of these bacteria can make their own energy using a red protein - when the bacteria are productive, the red protein gives the north arm a pink glow. Brine shrimp have been found in the north arm, but some scientists think they are transients rather than residents. Algae also live in the North Arm; the species Dunaliella salina produces beta-carotene which makes the water look red. The North Arm isn't salty enough for these algae to do really well; they do better in the salt evaporation ponds.		photos of north arm (relatively pink and relatively not pink); photos of bacteria
	LK2.E01.in01	interactive	What's that smell				
	LK2.E01.ap01	activity prompt	instructions for what's that smell interactive		Press and sniff		

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	LK2.E01.gc01	graphic caption	Graphic caption explains the origin of the causeway and its effect on the lake	The construction of the causeway separated the lake into 2 very different habitats.	In 1959, a causeway across Great Salt Lake replaced the original railroad trestle across the lake. The causeway effectively divided the lake, limiting water flow between the north and south arms. The south-arm brine became less salty than the north-arm because all three of the major tributaries (the Bear, Weber, and Jordan Rivers) flow into the south arm. The north arm mainly received salty water that moved through the causeway from the south arm. The south arm became higher, about 3 1/2 feet higher than the north. The water in the south arm became stratified, with heavier saltier water sinking to the bottom, and less salty water at the surface. Before the causeway, the lake waters and inhabitants were homogeneous; after the causeway, the lake essentially became 2 different habitats, a very salty, less diverse north arm, and a less salty, more diverse south arm.		photos of pre-1959 trestle, photos of causeway under construction, satellite image of lake today; satellite image of lake pre-causeway
LK2.E01.gp02 South Arm of the Lake		graphic panel					
	LK2.E01.si02	section intro	Section intro explains how the lake is Great (size), Salt (chemistry) and a terminal lake.	The Great Salt Lake holds the memory of every drop of water that's been in it.	The Great Salt Lake is the largest salt lake in the Western Hemisphere, and the 4th largest in the world. It's larger than the state of Rhode Island! Great Salt Lake is the remnant of freshwater Lake Bonneville, a great ice age lake. As the climate warmed and the lake shrunk, water evaporated, and the lake became salty. Although the Lake is "great, " it's only about 20' deep, so a rise in lake level can spread over a wide area, potentially causing flooding. Great Salt Lake is a terminal lake - no rivers flow from it. A causeway across the lake, completed in 1959, has effectively split the lake into 2 - a North arm and a South arm.		
	LK2.E01.ms02	mindset	South arm inhabitants		The lake's freshwater sources all flow into the south arm, and it's less salty than the north arm (3-16% vs. 16-28%). But it's still 3-5 times saltier than the ocean! Compared to the North Arm, the South Arm of the Great Salt Lake teems with life. The primary producers are algae and photosynthetic bacteria. Algae float in the water column, and are the primary producers. lanktonic producers are mostly algae; a dozen or so species are known from the lake. Many of these algae are diatoms. There are also cyanobacteria in the plankton layer and at the bottom of the lake. When the water is clear, the bottom dwelling benthic producers are very active, producing an algal mat where brine fly larvae graze. Brine shrimp also live in the South Arm, as do corixids, or "water boatmen." Algae bloom in the winter. Brine shrimp and brine fly larvae eat the algae in the spring; brine shrimp reproduce in the summer. Migratory and resident birds eat the brine shrimp and the brine flies.	South Arm Winogradsky column	South Arm foodweb; photos of algae, bacteria, brine flies and larvae, brine shrimp, corixids
	LK2.E01.in02	interactive	What's that smell				
	LK2.E01.ap02	activity prompt	instructions for what's that smell interactive		Press and sniff		
LK2.E01.gr03 North Arm Winogradsky Column		graphic rail					
	LK2.E01.sx02	special exhibit	North arm Winogradsky column and microscope with slide tray.		w. instructions for microscope use		(with photos of north arm, relatively pink and not, photos of bacteria)
	LK2.E01.ar01	artifact label	artifact label describes cyanobacteria and algae				photos of cyanobacteria and algae
	LK2.E01.ar02	artifact label	artifact label describes rust nonsulfur photosythetic bacteria				photos of rust nonsulphur bacteria

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	LK2.E01.ar03	artifact label	artifact label describes red/purple photosynthetic bacteria and green photosynthetic bacteria				photos of photosynthetic bacteria
	LK2.E01.ar04	artifact label	artifact label describes the Winogradsky column		How many layers can you see in the tube? The museum collected water and sand from the North arm of Great Salt Lake. In this column, the different microlife forms separate out into layers. At the top are cyanobacteria and algae, using oxygen, below them, in a non-oxygen zone, are photosynthetic bacteria. Each layer is its own habitat, with different chemical and organic materials; the layers interact, with nutrients moving from one layer to another.		
LK2.E01.gr04 South Arm Tube		graphic rail					
	LK2.E01.sx03	special exhibit	South arm tube and microscope with slide tray (with captioned photos of inhabitants.		instructions for magnifiers/microscope		(with photomicrographs of diatoms, bacteria; photos of brine flies, brine fly larvae, brine shrimp, brine shrimp cysts; food web diagram; photos of south arm)
LK2.E01.fl01		family label	family label panel - brine shrimp	Brine shrimp thrive in salty water; millions of them live in Great Salt Lake.	Can you see the brine shrimp swimming in the tube? Brine shrimp like to live in salty water, so Great Salt Lake is a perfect home for them. Would you have one as a pet? A large kind of brine shrimp is sold as "sea monkeys" that you can raise at home.	model of brine shrimp	sea monkey ad, brine shrimp illustration/photo
	LK2.E01.ar02	artifact label	artifact label discusses brine shrimp		Brine shrimp, sold to gullible comic book readers as "sea monkeys" are probably the best known inhabitants of the lake. Brine shrimp are crustaceans with multiple larval stages. Their thick-walled eggs, called cysts, can survive for a long time if kept dry, hundreds of years even. Adult brine shrimp feed on the phytoplankton and graze on the benthic algal mat. Their feces provide the core for the oolitic sands of the lake. Brine shrimp are an important part of the GSL ecosystem; they are food for millions of migrating birds, and the basis of a multi-million dollar brine shrimp egg industry. - specific features to look for		photos of brine shrimp, brine shrimp cysts
LK2.E02 Lake Habitat-Wetlands			Visitors will see a reconstruction of a wetland habitat, and learn how wetlands filter water.		GSL and its surrounding habitats include extreme environments that make a healthy GSL. Wetlands are teeming with life, but also play the important role of filtering and nourishing the watersheds on the western Wasatch Front.		

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	LK2.E02.sx01	special exhibit-diorama	Bird and animal habitat; area closes to rail allows visitors to see underwater; foreground includes aquatic insect windows, chub and carp underwater, amphibians and tadpoles underwater, great blue heron striking at fish/amphib. underwater Species represented include marsh marigold, bulrush, duckweed, hornwort, pondweed, rushes, cattails, crayfish, mosquito, tiger salamander, dragonfly, heron or other bird and nest, chub and carp, garter snakes, muskrat and/or beaver, leopard frog, mink, yellow-headed blackbird, marsh hawk, marsh wren, ibis, meadow vole, water strider, diving beetle; includes soil/plant cross section; place reference Bear River Refuge or Shoreline Preserve. Includes filtration plant/soil section. Possible scenes: soil/marsh plant section vole runways/tunnels dragonflies perching on cattails leopard frog eating a mosquito muskrat eating cattail roots eared grebe nest				
	LK2.E02.pm01	photomural	Wetlands photomural of Bear River Refuge or Shoreline Preserve showing reeds, cattails, bulrush, spikerush, cattail, arrowgrass, reeds, birds flying overhead		caption/credit for photomural		
LK2.E02.gr01 Wetland intro		graphic rail					
	LK2.E02.ms01	mindset	Mindset panel describes the wetland and its role in the watershed, and in migrations.	Wetlands are teeming with life, and support millions of migratory birds. The wetlands also play a critical role in the Salt Lake City watershed.	Wetlands are, as you would expect wet, with water, soils that hold water, and plants adapted to living in water. You find wetlands at the transition of land and water ecosystems, like at the shores of a lake or river. The wetlands around Great Salt Lake are marshes; marshes teem with life, and provide food and places for migratory birds to breed and nest. Wetlands filter water, and their water-loving soils hold water, like a sponge, releasing it under dry conditions. Less than 1.5% of Utah's land area is wetlands; 3/4 of the state's wetlands are in the Greater Great Salt Lake ecosystem. Wetlands - essential to our watershed and to millions of plants and animals - are threatened by development. captions for foodweb		wetland foodweb, photos of Utah and SLC wetlands; map of Utah wetlands 1920s and today
LK2.E02.id01		id label	Graphic id calls out and describes particular plants and animals and their connections.		where do they get their energy, where are they found (where to spot them), name, fun fact	marsh marigold, wild iris, crayfish, mosquito, dragonfly, heron or other bird and nest, chub and carp, garter snakes, leopard frog, mink, yellow-headed blackbird, muskrat, meadow vole	
LK2.E02.gr02 Filtration		graphic rail					

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	LK2.E02.in01	interactive	This interactive demonstrates the filtering mechanism provided by a wetlands root system.		• Set into the wetlands scenic the interactive cabinet has trapezoidal plan with an inclined acrylic top revealing an inclined plane below. A crank handle is positioned on the long side toward the back of the cabinet. • Transparent balls are used to represent water and larger black balls to represent pollution particles. • The filtering demonstration: As the balls roll down the plane many of the large marbles are caught in cages. The cages are comprised of multiple arrangements of three pins set into the plane surface. The water balls pass through and around the cages and fall into a collection area at the foot of the plane. Some pollutant balls bypass the cages and also collect with the water balls.		
	LK2.E02.ap01	activity prompt	instructions for filtration interactive		Visitors lift a bin of marbles and pour them into the top of the interactive, then lift a barrier panel to let the marbles flow through the "wetland." Clear "water" marbles flow through; black "pollutant" marbles are filtered out.		
	LK2.E02.fp01	focus panel	Focus panel accompanies soil cross-section and describes filtration process.	Wetlands act as a sponge, soaking up water, and as a filter, removing contaminants.	Wetland soil contains not just dirt, but also minerals and organic material. Organic material is the remains of plants and animals. The rich soil and the plant life of wetlands both filter water and absorb water. Like a giant sponge, wetlands absorb incoming water from rain, rivers, runoff from spring melt and precipitation, and groundwater. Wetlands hold the water they absorb in wet periods, and release it to the surrounding areas when it's dry. So wetlands act as a buffer against extremes of drought and flooding. Wetlands also filter surface and ground water, removing harmful phosphates, metals, and agricultural runoff. The plants take up these materials so they don't contaminate rivers and groundwater.		with diagram of soil and plants
LK2.E02.gr03 Wetland Adaptation		graphic rail					
	LK2.E02.fp01	focus panel	Focus panel describes animal and plant adaptations to life in wetlands.	Plants and animals adapt to living in wetlands in different ways.	Wetland plants need to find ways to get oxygen in a water saturated environment. Underwater plants (submergents) have extra air pockets on their roots or stems to store oxygen. Plants that live partly in and partly out of the water (emergents) get their oxygen from a tube that goes above the water surface. Floating plants "breathe" through the parts of their leaves that are above water. Different animals have different adaptations to life in the wetlands. Birds and mammals have webbed feet that help them swim. Some birds, like ducks, have wide bills they use to filter food from the water. Other birds have long legs suitable for wading, and long necks that can help grab fish and other prey under water. Wetlands mammals have oily fur that repels water. Some mammals can hold their breath under water - beavers and muskrats can hold their breath for about 15 minutes.		close-up photos or illustrations of air spaces on stems and roots, photo of floating plants; photo of duck foot, beaver foot; duck bill; long-necked wading bird
LK2.E02.fl01		family label	Family label about insect adaptations	Bugs swim, dive, and even skate across watery habitats.	Did you know that bugs live on and under water? Can you see the water strider? Its oar-like legs help it skate on the surface of the water. Look under the water for the diving beetle. It grabs a bubble of air before it dives so it can stay under water longer.	water strider and diving beetle models	photo of water strider and diving beetle
LK2.E02.tm01		trail marker			Sustainability trail - wetlands restoration, links to Nature Conservancy Shorelands Preserve and Bear River Preserve; Inland Sea Shorebird preserve		

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
LK2.E03 Lake Habitat- Shoreline			Visitors will see a diagrammatic diorama of the lake's shorelines, and learn the importance of shorelines and playas.				
	LK2.E03.sx01	special exhibit	Shoreline reconstruction; reconstruction is a transect from lake to playa to pickleweed zone to saltgrass zone to greasewood zone Species include tiger beetles, spiders, grasshoppers, pickleweed, salt grass, salt bush, greasewood, iodine bush, inkweed, shadscale, snowy plover, northern harrier, American avocet, vole, badger, Savanah sparrow Possible scenes: soil cross section showing tiger beetle burrow, vole runway fox menacing snowy plover nest avocets feeding northern harrier flying overhead (after voles) vole eating grasshopper or Mormon cricket harrier nest?				
	LK2.E03.pm01	photomural	Shoreline photomural depicting the view from within the lake looking out		caption/credit for photomural		
LK2.E03.gr01		graphic rail					
	LK2.E03.ms01	mindset	Mindset panel describes the shoreline ecosystem zones and their importance.	The shores of Great Salt Lake are home to many plants and animals adapted to live in salty areas.	The shores of Great Salt Lake are home to many plants and animals adapted to live in salty areas. These playas, salt flats, and salt marshes are not as lush as the wetlands, but still support food webs. Where rainfall has lowered salt levels, plants like pickleweed , iodine bush, and greasewood grow, providing food and shelter for bugs, birds and other animals. The animals eat the plants' seeds, rather than the plants themselves. Different plants can withstand different levels of salt in the soil, so they tend to be found in zones depending on the concentration of salt. The main zones around the lake are: playa, pickleweed, saltgrass, and greasewood. caption for foodweb		shoreline foodweb
LK2.E03.gr02		graphic rail					
LK2.E03.rc01		rail case	Salt crystal specimen display				
	LK2.E03.ar01	artifact label	Artifact labels explains the salt industry.		Great Salt Lake includes 15 natural salts. On an average day, nearly 4 1/2 billion tons of salt are in solution in the lake. Salt and other minerals are extracted from the lake through evaporation from diked ponds. Common salt (NaCl) from the lake is used in cattle feed, food processing, water softeners, and highway salt. It isn't used for table salt.		includes aerial photos of lake and evaporation ponds; photo of spiral jetty.
	LK2.E03.gc02	graphic caption	Graphic captions describes the Bonneville salt flats and their formation.		The Bonneville Salt Flats are a 30,000 acre expanse of hard, white salt crust. Near the center, the crust is almost 5 feet thick in places, with the depth tapering off to less than 1 inch as you get to the edges. The Bonneville Salt Flats are comprised of approximately 90% common table salt. The Salt Flats have been home to speed racing events since the 1930s.		photos of salt flats, speed events
LK2.E03.fl01		family label	Family label about the snowy plover		Can you see the baby birds in their nest? They are snowy plovers. The nest may not look like much of a nest - it's a shallow hole lined with pebbles or shell pieces. The plovers come to the salty shores of the lake to feed on brine shrimp, and to lay their eggs.		photo of nest, baby plovers
LK2.E03.gr03		graphic rail					

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	LK2.E03.fp01	focus	Focus panel discusses animal and plant adaptations to life along the shoreline.	Plants and animals adapt to life along the salty shores of the lake.	Animals and plants of the shorelines and salty playas have special adaptations for dealing with salty soil. The plants (known as halophytes) often have specialized cells that store salt. Salt grass secretes salt crystals out to the surface of its leaves. Iodine bush stores salt in its succulent segments. Shadscale is covered with hairs that secrete salt. When the hairs are full, they burst, covering the leaves with salt. In this very open environment, animals need to find places to live, hide, store food, and raise young. Voles tunnel under the soil and store salt grass seeds underground. Northern harriers build nests low to the ground; they fly over the playa in search of prey.		photos or illustrations of salt grass w. salt on leaves, iodine bush, vole in tunnel
LK2.E03.id01		id label	Graphic id describes particular plants and animals and their connections.		where do they get their energy, where are they found (where to spot them), name, fun fact		tiger beetles, spiders, grasshoppers, pickleweed, salt grass, greasewood, iodine bush, inkweed, shadscale, snowy plover, northern harrier, American avocet, vole, badger
	LK2.E01.av01	av	GSL soundscape				
LK2.E04 Migrations			Visitors see a graphic montage of the changing seasons of the lake, and the different faunal and floral inhabitants and visitors at each season.	GSL plays a critical role of hemispheric importance for millions of migratory birds.			
	LK2.E04.ms01	mindset	Primary text introduces migrations and describes the lake's importance in the Pacific and Central flyways; includes brine shrimp as important food source.	The Lake is a vital stop for many birds' yearly migrations.	Great Salt Lake is designated as a Western Hemisphere Shorebird Reserve, a recognition of its importance to millions of birds who stop here every year. Birds migrate to take advantage of longer days in the north for breeding season, and warmer climate and food availability in the south the rest of the year. Most migration routes are north-south. GSL is critical to the Pacific and Central flyways; more than 30 species of birds use the lake every year. They nest in the marshes, rest and refuel, and feed on brine shrimp and brine flies. Waterbirds like duck and geese stop at Great Salt Lake as they migrate between Canada and Mexico and South America. The lake is home to the world's largest breeding population of California gulls. "It's like the lonely gas station on Route 66 for birds." Don Paul, biologist		
	LK2.E04.in01	interactive	Migration map with routes		migration map captions: Pacific and Central flyways, location of GSL, birds that use the different flyways		
	LK2.E04.ap01	activity prompt	Prompt for map interactive		touch a bird to see its migration route		
	LK2.E04.gi01	graphic images	Images of migratory birds, their homes and migration destinations, the numbers that visit the lake annually, and what they do/feed on at GSL.				

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	LK2.E04.gc01	graphic captions	Graphic captions identify migratory birds, their homes and migration destinations, the numbers that visit the lake annually, and what they do/feed on at GSL.		migratory bird montage captions: for each photo, location and time of year, birds present; for each bird, when and where it is at GSL and what it's doing there		photos of groups of birds nesting, feeding, etc.; should include eared grebe, northern shoveler, common goldeneye, american avocet, black-necked stilt, Wilson's phalarope, American white pelican, snowy egret, white-faced ibis, bald eagle, yellow-headed blackbird, peregrine falcon, western meadowlark, long-billed curlew
	LK2.E04.sx01	special exhibit	Models of flyway/migratory birds (10-15 ea.): white pelican (fly in straight line or v formation), white-faced ibis (fly in straight line w. neck extended), tundra swan (fly in straight line or v w. neck extended)		Wilson's phalarope: this shorebird has a long, thin bill and feeds on brine flies and insects while it's at the lake. They breed in freshwater marshes around GSL, then fly on to Argentina in the fall (3000 miles). Unlike many birds, the females have brighter plumage than the males. American white pelican: pelicans use their big bills to scoop up fish. They build nests on Gunnison Island, and fly south for the winter. White-faced ibis: this ibis breeds in the lake's freshwater marshes. GSL hosts the world's largest population of this bird. Eared grebe: eared grebes nest in freshwater marshes around GSL; most migrate south in the winter. They scoop up salty lake water, then use their tongue to squeeze out the water, leaving brine shrimp. Look for the grebe's red eyes and fan of bright feathers behind the eye.		
	LK2.E04.gc02	graphic captions	bird captions				
LK2.E05 People and The Lake			Visitors watch an AV program about the lake's resources and the impacts of human use of the lake and watershed. An inset case holds artifacts created by the lake's earliest human residents. Visitors learn how and where these peoples made a living, and of their possible role in large mammal extinctions.				
LK2.E05.gp01		graphic panel					
	LK2.E05.fp01	focus panel	Focus panel discusses prehistoric and historic use of the lake.	The archaeological record tells us that Great Salt Lake and its resources was a magnet for prehistoric people. We don't feel the same pull - why?	Paleoarchaic peoples came to the lake and its marshes to fish, hunt, and find freshwater. Some lived around the lake shores, others had hunting camps on the shore, on Antelope Island, or in nearby caves. The first Europeans arrived in 1700, some 9000 years after the paleoarchaic people. These explorers were followed by trappers, including Jim Bridger and Kit Carson. Brigham Young and his followers arrived in 1847, and established Salt Lake City. In the late 1800s and early 1900s, a number of large resorts thrived on the lake's shores. Saltair, the best known, had the world's largest dance pavilion and a roller coaster. Tourists and residents thronged to these resorts until the 1930s, when the lake level fell. With the lake at 4200 feet, Saltair was almost a quarter mile from the lake's edge.		artist's recreation of early lake residents

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					Lake Bonneville/Great Salt Lake, its extensive wetlands, and the riverine systems that fed the lake have been important economic resources for people for over 11,000 years. The high saline content of the Great Salt Lake precluded the possibility of fishing, so archaeologists believe that the greatest amount of effort was spent in the acquisition of marshland resources (both floral and faunal). Important food plants prior to the arrival of white settlers included cattail, pickleweed, and wheatgrass. Numerous waterfowl, eggs, small mammals, and insects were easily found in the nearby marshes. Fish and fresh water mussels were taken from the nearby rivers and bison frequented the extensive grasslands just north of the lake. Local plants critical for hunting and basketry technologies were bulrush, milkweed, common reed, and willow. The lake region also contains stone and mineral resources that were exploited. The eastern Great Basin contains an unusually high number of obsidian sources—an important, high quality toolstone created through volcanic activity. Clays in the regic These factors combined appear to be an idyllic setting for hunting and gathering peoples; food was available year-round, high quality toolstone was attainable within a short traveling distance, and habitation sites could be located near plants used in domestic technologies. However, scholars (Madsen and Janetski 1990:2) argue that "from an evolutionary ecological perspective, Great Basin wetlands are neither 'good' nor 'bad,' Basin lakes and marshes are not 'better' than Basin uplands and terrestrial resources are not 'better' than lacustral resources….Basin wetlands vary in size, composition, and reliability, as do adjoining areas of foothill and mountain environments. They vary in productivity and proximity to other necessary resources." Regardless of the region's equanimity to other resource localities, it is evident in the archaeological record that use of the Lake Bonneville/Great Salt Lake's marshland and riverine environments shifted over time. Paleoarchaic settlement in the region was high but slowly tapered off until by the Protohistoric period when settlement in the area was comparatively decreased. One exception is Utah Lake, which contained an extensive fishery and sustained a year-round sedentary community of Utes known as the Timpanogots. In the historic period, focus shifted from the marshlands and rivers surrounding the lake to the lake itself. Not long after the arrivals of the Mormon settlers, salt production geared up to become an important industry; other industries that followed included potash, magnesium, and brine shrimp production. Recreation on the Great Salt Lake was largely focused on the buoyant nature of the water and many lakeside resorts developed along the shoreline as early as the late nineteenth century. On the west desert the salt flats became the ideal setting for world land speed records as late		
LK2.E05.ic01		inset case	Inset case holds prehistoric and historic artifacts made by lake dwellers				

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	LK2.E05.ar01	artifact group label	Paleoarchaic Sites associates with the Great Salt Lake Paleoarchaic (ca. 11,400-7000 BC)		During the Paleoarchaic period Lake Bonneville extended as far as the Provo (14,500-13,500 y.a.) and the Gilbert (11,000-10,000 y.a.) shorelines (see Curry's map). "In terms of wetland ecology high lake levels at this time would have greatly restricted fresh water marshes to a thin band along the eastern mountains. Westward of the thresholds containing productive inset marshes, the waters of [Lake Bonneville] would have been salty...exceeding the salinity of the ocean by several times." (Fawcett and Simms 1993:7) The Paleoarchaic people were highly mobile hunters and gatherers. To date, there is no direct evidence that the people who exploited the Lake Bonneville region hunted mammoth, mastodons, and other mega fauna although these animals did inhabit the region during the Late Pleistocene. After the extinction of the mega fauna, large game animals, such as bison and deer, were likely preferred but were not hunted exclusively; small game was captured opportunistically as well. Groundstone tools have rarely been found at North American Paleoarchaic sites (none have been found in Utah) suggesting that foods which required intensive processing were not actively sought. Most Paleoarchaic sites in the eastern Great Basin are located within the now-extinct Lake Bonneville marshland system suggesting that resources found in this environmental zone were highly sought after, although direct evidence is lacking.	a0644, a2835, a2836, a2837	
	LK2.E05.ar02	artifact group label	Archaic Sites Associates with the Great Salt Lake (ca 7,000 BC-AD 400)		By the Archaic period, Lake Bonneville had shrunk considerably. "Great Salt Lake fluctuations likely had great consequences for marsh structure and human settlement. Regressive lake levels in a shallow "skillet" such as the Great Salt Lake created increased area for freshwater marshes and other wetland ecosystems to develop between the confines of the lake edge and the mountains. Conversely,…lake levels could flood tremendous amounts of potential marsh habitat with brackish water. Given the shallow gradient of the land surface along the Great Salt Lake, short term fluctuations significant to humans should be expected. This is especially relevant when considering the periods after 1500 BP when lake fluctuations approximate those we see in the historic period. (Fawcett and Simms 1993: 8-9). Between 7000 and 6000 BP there is considerable evidence for a significant drying and shrinking of the Great Salt Lake. Such low levels would have created enormous wetlands along the eastern shores as fresh water flooded the areas along the Wasatch Front. After 6000 BP the lake began expanding again until it reached a maximum extent around 3500-2000 BP. Virtually all of the flat terrain along the eastern shores would have been flooded leaving little room for wetlands. Human use would have been curtailed, but to what extent is unknown. A preliminary examination of upland sites in the Wasatch Mountains east of the Great Salt Lake, the Grouse Creek area, and the Raft River Mountains north of the Great Salt Lake suggest an increase in use of upper elevations during this time. (Fawcett and Simms 1993: 9-10)	a0506, a0507, a1031, a1032, a1034, a2200, a2203, a2208, a2209, a2839, a2840, a2842, a2843, a2844, a2845, a2846, a2847, a2848, a2849,	

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					In the early Archaic, lowland sites in the eastern Great Basin were almost exclusively located in marshland settings. People lived in caves and rockshelters adjacent to fresh water springs on the periphery of the Great Salt Lake. People collected local plants, such as pickleweed, burroweed, cattail, willow, and bulrush. Some were consumed while others were used to make mats, baskets, and other woven objects. Animals hunted in the immediate area include rodents, marsh avian, and insects. By the Middle Archaic, around the time of the lake expansion, population had increased and people were increasingly exploiting upland zones, away from the lake basins; this was likely part of a seasonal round of exploiting both uplands and lowlands at peak times of the year. In the Late Archaic, people who lived in the marshlands narrowed their diet to only a few plant species and marshland game may have been hard to come by. The loss of resource availability resulted in the abandonment of a large number of lake-periphery sites. In general, however, food choices did not change dramatically from the early Archaic; foraging		
	LK2.E05.ar03	artifact group label	Late Prehistoric Sites Associates with GSL Fremont and Promontory (ca. AD 400-1400)		During the Fremont and later Late Prehistoric periods people depended on a wide array of marsh plants including bulrush, cattails, mustard, chenopods, plantago, and marsh grasses. Common animal resources include fish (probably caught in traps along the rivers), ducks and other shore birds, muskrats, and fresh water mollusks. Bison bones are also quite common in these sites. Most of these resources were collected seasonally, probably in the spring and again in the fall (Madsen 1989:50)." Some resources, such as cattail rhizomes, had a greater degree of nutrition in the winter; their starch content is highest from the late fall to the early spring (Madsen 1982:208; Madsen 1997). In fact, of the many plants available to people living in this environmental zone cattail has the highest caloric return rate, even after processing. This would make it the highest ranked wild plant among the available choices (Simms 1984: Table 2).	a2859-a2867, a2202, a2204, a2206, a2857, a2194,	
					The adaptive strategy of the Great Salt Lake Fremont has typically been seen as one that is heavily dependent on hunting and gathering, contrasting in this regard with Fremont peoples in other regions. However, it is likely that this generalization is an artifact of research and the paucity of intact sites due to early urbanization of the Wasatch Front. The presence of ample water from the Wasatch Mountains and the climactic tempering effects of the lake suggest the northern Wasatch Front would have been favorable for Fremont agriculture. Reassessment of sites east of the Great Salt Lake clearly show some Fremont were as heavily reliant on farming as any Fremont known. The presence of very large wetlands in the Great Salt Lake region would affect the expectations for or against an agricultural strategy in different ways. On the one hand wetland resources would have fostered increased diversity in Fremont lifeway, with some Fremont possibly opting out of the agricultural strategy in favor of full-time hunting and gathering.		

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					On the other hand, the wetland resources would have supplemented agricultural strategies pursued outside of the wetlands themselves, but in close proximity to insure use of such wetlands. The decision to utilize cultigens is probably not restricted to an either or proposition, but rather expressed in a variety of settlement strategies. Some of the pressures acting upon foraging strategies in this case would be the costs, benefits, and constraints of variables such as group size and movement in light of the handling transport, and storage costs/benefits of wild or domestic resources (Fawcett and Simms 1993:18, almost verbatim). The mid to late-1200s was a tumultuous time for the local farmers. The transition to the Protohistoric period is characterized by an apparent abandonment of agriculture, less investment in architecture and ceramics, and a shift to increased mobility. This would have been a difficult time for the part-time horticulturalists; a large migration of hunter-gatherers would have increased competition for the wild resources that allowed variability, and thus flexibility, to be a part of the Fremont diet. One group that lived coevally with the Fremont farmers was those of the Promontory Culture who arrived in the area around AD1200-1300. Current research (Ives 2008, personal communication) suggests that these hunter gatherers came from subarctic Canada and were heavily dependent on bison and local marshland resources. Whether they stayed in the area and mixed with later migratory groups or moved on before the Numic expansion is unknown at this time. Either way, evidence of the Promontory Culture is brief in the eastern Great Basin.		
	LK2.E05.ar04	artifact group label	Protohistoric Sites Associated with the GSL Shoshonean (ca AD 1400-1825)		The shift to a cool/dry environment featuring winter rainfall after AD1350 is more difficult to translate into lake level, but judging from state temperature and precipitation in the historic period, cool dry intervals around the turn of the century and a less marked interval at mid-century both correlate with low levels of the Great Salt Lake. This was a time when farmers and foragers were presented with a fundamentally different suite of circumstances and decisions. It is no wonder archaeologists detect a more marked cultural change at this time (Fawcett and Simms 1993:12-13, verbatim). After around 600 years ago the Fremont archaeological complex can no longer be found in the eastern Great Basin. Most scholars believe that the end of the Formative way of life was caused by a combination of environmental degradation and a slow population replacement of indigenous Fremont groups by newly arriving hunter-gatherer groups. The best current evidence suggests that the predecessors of the historic aboriginal groups in the Great Salt Lake region arrived in the area about 500-600 years ago. The subsistence adaptation of historic Shoshonian groups (Shoshone, Goshute, Ute, and Paiute) was probably very similar for the Late Prehistoric people. In general, subsistence resources from the lake were based on a mixture of wild flora and fauna, especially waterfowl, small mammals, and fish. It was based on the movement of small groups from one area to another as differing resources became available. Occasionally when local resources were particularly abundant these small groups came together to participate in a variety of social activities (Madsen 1980; Simms and Heath 1990).	a2869-a2871	

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					The Shoshoni seemed to have depended less on lake, river, and spring edge resources than did previous groups, but there were exceptions such as the virtually sedentary Ute of Utah Lake. Historic accounts and the archaeological record suggest that the eastern Great Salt Lake area may have been a buffer-zone between the Shoshone and Ute tribes around this time although both groups likely used the area as hunting and gathering grounds. Rather than concentrating on the lake margins, the Shoshoni also settled in the mountainous areas to the east. The Goshute settled on the south and southwest end of the lake.		
	LK2.E05.ar05	artifact group label	Historic Use of the GSL Historic 1824-1950		The earliest European-American to see and record the Great Salt Lake was a trapper named Jim Bridger in 1824; several important trapping/exploration parties led by John C. Fremont, Jedediah Smith, Stansbury, and Gunnison followed soon after. The importance of the lake as an economic and recreational resource was not lost on the Mormon settlers. Early industries that developed on the lake include salt, potash, brine shrimp, and magnesium production. For recreational use, elaborate bathing resorts were developed on the lake and the smooth, open race course on the salt flats was the premier location for world land speed records. The Great Salt Lake is also the home of one of the greatest examples of earthworks art in North America. The earliest recording of salt use was in Father Escalante's 1776 journal, which noted that local Indians used the surrounding salt deposits, likely for meat preservation. However, salt as a commodity did not come into play until early settlers arrived in the Salt Lake Valley. Around 1847 the first commercial salt boiling operation was established on the shores of the Great Salt Lake. Within a few years salt was being extracted thru the use of artificial evaporation ponds, one of several methods still used today. In the years 1860-1895, the demand for crude salt in the silver refining industry resulted in a dramatic increase in salt production. By the years 1880-1915 there were twenty different companies producing salt on the shores of the Great Salt Lake. The famous Morton Salt Company established a competitive foothold in the area in 1918 and has been a predominant force ever since. In spite of the large quantities of salt found here, Utah produces only 1 percent of the nation's salt supply-this statement may need updated numbers (Clark and Helgren 1980) Not long after the arrival of the Mormons to the Salt Lake Valley in 1847 the lake became popular as a place for swimming because of the extreme buoyancy of the water. By the late 19th century, nine resorts were clustered on the south shore and two on the east shore. Although not the first resort to be built, the most famous by far was Saltair. The Saltair resort and railroad was built in 1893; the largest stockholder was the LDS church whose first presidency wanted to provide a place for wholesome entertainment. When finished, Saltair was an architectural wonder. The entire complex measured over 1,000 feet from tip to tip and wings on either side of the pavilion extended crescent-like onto the lake. When it opened the resort's main attractions were swimming and dancing; the ballroom was so big it was advertised as the largest in the world. Sometimes people would stay all day, swimming and relaxing in the morning and afternoon and dancing all night until the last evening train back to Salt Lake (McCormick and McCormick 2002).		
LK2.E05.qt01		quote	quote about how prehistoric people used the lake				

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	LK2.E05.in01	interactive	Lake talk back board where visitors engage in a dialogue about the lake; possible framing questions: who owns the lake? what do you love/hate about the lake? where were you when ______? The talkback board is a flexible format so the questions can change, responding to current issues/legislation, or to visitors' suggestions for questions.				
	LK2.E05.ap01	activity prompt	Prompt encouraging visitors to respond to the lake.				
	LK2.E05.av01	av	The People and the Lake video explores current and historic human interactions with the lake, from management, to industry, to recreation. Visitors will find that the lake means many things to many people. Visitors stand around a circular tabletop display and watch a series of interviews with different Salt Lake experts and local residents. They hear differing opinions on the lake's value and what makes it fascinating (or repelling). 7 min.		The program consists of a series of short interviews. Topics include resource extraction, recreation, Salt air, brine shrimp harvesting, birding, rowing, sailing; natural and man-made historic changes. The interviewees might include: a duck hunter, biologist, geologist, local historian/long-time resident, lake manager/planer, representative from Macro or other industry, rancher, birder, brine shimmer, sailor, artist, and activist/conservationist. The interviews are punctuated with historic and new images (Salt air, graduate students at work on the lake, etc.)		
LK2.E05.gr01		graphic rail					
	LK2.E05.ms01	mindset	Mindset panels describes human interactions, and human's complex relationship to the lake; includes inspirational quotes. Sample quote: To travelers so long shut among the mountain ranges a sudden view over the expanse of silent waters had in it something sublime. Several large islands raised their rocky heads out of the waves. . . . Then, a storm burst down with sudden fury upon the lake, and entirely hid the islands from our view. John C. Fremont, Report of the Exploring Expedition to the Rocky Mountains, 1845	"People have been using the lake and surrounding habitats ever since the first Paleo-archaic people arrived in the area more than 11,000 years ago.	In historic times, birders, hunters, boaters, swimmers, and hikers have found recreation opportunities at the lake. Industries use the lake, too, extracting salt and minerals. The brine-shrimp industry harvests brine-shrimp eggs, for use as fish food, and exports them world wide. The shrimp you eat in a Salt Lake City restaurant may have been raised on brine shrimp eggs from the lake! The state of Utah owns the lake. The people of Utah own the water in the lake and the bottom under the definition of GSL as "Navigable Waters of the US;" the shoreline is largely privately owned. The lake supports wildlife, provides opportunities for jobs and recreation, yet scientists are just beginning to understand how the lake works. How can we manage the lake and make decisions for its future? Sample quote: "To travelers so long shut among the mountain ranges a sudden view over the expanse of silent waters had in it something sublime. Several large islands raised their rocky heads out of the waves...Then, a storm burst down with sudden fury upon the lake, and entirely hid the islands from our view." John C. Fremont, Report of the Exploring Expedition to the Rocky Mountains, 1845		with beauty shots of various lake locations, including industry; or maybe it's beauty shots of different views of the lake

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	LK2.E05.gc01	graphic captions	Graphic captions accompany photos of lake resources and extraction.		Extractive Industries and Resources: **Brine Shrimp:** Brine shrimp can live in wild fluctuations in salinity. The female can both lay eggs and give birth to live young. Brine shrimp are used to feed shrimp farmed in countries, especially Southeast Asia. The farmed shrimp are then imported to the U.S. Over 10 million pounds of brine shrimp eggs are collected every year. http://www.deq.utah.gov/Issues/GSL_WQSC/docs/related_fact_sheets/GSLBrineshrimp.pdf (source for the above figure) **Brine Flies:** Birds eat the brine flies. Migratory birds along the Pacific Flyway come to feed on the flies and then travel south. **Minerals:** A company called Mineral Resources International sells trace minerals from the lake that are then used to make health food and skin care products that are sold over the world. **Salt:** The salt industry uses underwater canals (without the use of pipes) to collect water in evaporation ponds near Promontory Point. **Oil:** There is now oil drilling near the Spiral Jetty. **Recreation:** The lake is used for recreational boating and for crew. The Saltair resort, once located on the lake, was kr		with photos of shrimp harvest, mineral extraction, salt ponds, boating, biking, rowing, evaporation ponds
	LK2.E05.ms02	mindset	Mindset panel explains the state of what we know about the lake, and poses questions about its future management.	We need to more about the lake to be able to make informed decisions about it in the future.	We still have a lot to learn about the lake, and some of our past efforts to manage the lake have proved disastrous. Recently, local activist, conservation, and scientific groups decided to join forces to better understand and study the lake, and formed the Great Salt Lake Institute. Although our scientific understanding of the lake and its inhabitants is growing, we need to be able to link that knowledge to legal and civic action to effectively manage the lake for future generations. Salt Lake City and the Wasatch Front are growing rapidly - what effect will that growing populations (and the increased roads and water use) have on the lake? High levels of mercury were found in the lake - what does this mean to the lake's migratory bird population, and to us? Do we value the lake properly?		photos of pumping stations; satellite images of lake at recent highs and lows
	LK2.E05.sp01	story panel	Story from scientist		Bonnie Baxter or Rob Baskin		
	LK2.E05.sp02	story panel	Story from activist		Lynn deFreitas		
	LK2.E05.sp03	story panel	Story from artist		Rosalie Winard or Terry Tempest Williams		
LK2.E05.tm01		trailmarker	Link to evaporation ponds				
LK2.E06 Watershed/ Watercycle			Visitors see a video montage of beauty shots of particular points in the water cycle; surrounding graphics explain the details of the water cycle and locate the watershed. Visitors see how water moves through the GSL water cycle and demonstrate the importance of watersheds.				
	LK2.E06.av01	AV- Watershed	A cylindrical station features a tabletop AV display of evocative and beautiful images and natural sounds: snow falling, ice melting from trees, mist on the lake, rain clouds, Bear River. Surrounding the display, graphics and diagrams explain the Salt Lake City water shed and how water cycles through the region.	Salt Lake City is one of the few places where you can see the water cycle; the lake plays a critical role in it.	A short looping video program gives visitors a sense of how water cycles through the Salt Lake City Watershed. It shows water at various points from clouds above the city to water flowing into sewers. The program should start with clouds and rain, snow on mountaintops, then move to rivers, lakes and runoff, then to evaporation and ending/starting with clouds. The images should be of recognizable local places; brief captions will appear on the screen (e.g. icicle, Little Cottonwood Canyon).		
LK2.E06.gr01		graphic rail					
	LK2.E06.gi01	graphic image	Graphic diagrams, maps, and illustrations explain the water cycle and locate the key points of the Salt Lake City watershed.				

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	LK2.E06.gc01	graphic caption	Graphic captions accompany water cycle and watershed diagrams and maps.	A healthy watershed includes natural habitats from mountaintops to wooded canyons, to marshes and lakes.	The Wasatch Front is one of the few places where you can witness the entire water cycle: water evaporates off the lake creating rain and snow in the mountains, which precipitates or flows down into rivers and streams and returns to the lake. Note that water changes state (from rain/snow to water to water vapor) as it moves through the water cycle. Great Salt Lake's watershed covers about 20,000 square miles. 60% of the city's water comes from the watershed.		
LK3 Dynamic Lake			Visitors manipulate a model of the valley, and watch as, over time, the lake grows and shrinks, culminating in today's terminal lake. They can refer back to the map inlaid in the floor and the remains of these shorelines, rings in the mountains surrounding Salt Lake City, can be seen out the window (highlighted by graphic markers) and on an adjoining photomural. Visitors see how geologists use sedimentary cores to study the lake's pasts, and explore the details of the core with microscopes.				
LK3.E01 Lake Formation							
LK3.E01.gr01		graphic rail					
	LK3.E01.in01		Visitors turn a crank to select a time, and watch as the model fills to one of the precursor lake levels (Bonneville, Provo, Gilbert, Stansbury). The lake model includes landmarks (capitol, temple) and you-are-here (the museum).	The lake has changed dramatically over time; today's lake is a small remnant of the precursor lakes.	• The History of the formation of the Great Salt Lake is modeled in this interactive by changing the water level across a topographic map within a six-foot circular acrylic tank. The map replicates the Salt Lake City Region and illustrates area topography and includes models of the Utah state capitol building and Kennecot Stack. • Surrounding the tank is a cantilevered circular graphic rail. Graphics that represent six time periods from 24,400 BP to today are shown on a raised part of the rail that can be rotated in two directions. A three-dimensional pointer inside the movable part of the rail is fixed to the side of the tank. • By rotating the raised panel the water level in the tank is adjusted in response to the selection of different time periodfs. Six different historic levels can be modeled ranging from the high of Lake Bonneville through to the Great Salt Lake's 1963 historic low. Distinct shorelines are created by the intersection between the water level and the topographic map. • A ratchet mechanism provides resistance between setting positions.		
	LK3.E01.ap01	activity prompt	Activity prompt for lake model				
	LK3.E01.ms01	mindset	Mindset panel reviews the lake's formation and history.	Thousands of years ago, the Great Salt Lake was an enormous freshwater lake.	Great Salt Lake is a remnant of an ancient freshwater lake, Lake Bonneville, that stretched over 20,000 square miles of what is now Utah, Nevada, and Idaho between 32,000 and 14,000 years ago. Lake Bonneville was more than 1000 feet deep, and what are now Utah's mountain ranges were islands. Although the climate was cooler and wetter, the lake did rise and fall with varying rainfall and evaporation. About 16,800 years ago, the lake rose above the level of Red Rock Pass in Idaho, its only outlet, and the lake flooded into the Snake River Basin. The weight of Lake Bonneville caused the earth to depress - it's still rebounding today! A timeline of the Great Salt Lake 22,200 B.C.: Lake Bonneville, Stansbury level, 245 feet deep. 16,000 B.C.: Lake Bonneville, Bonneville level, 1,020 feet deep, as the climate becomes wetter. 14,800 B.C.: Lake Bonneville breaks through at Red Rock Pass, Idaho, making an outlet into the Snake Drive Drainage. Its level rapidly decreases. 14,200 B.C.: Lake Bonneville, Provo level, 640 feet deep.		maps showing extent of precursor lakes

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					10,800 B.C.: Lake Bonneville, Gilbert level, 75 feet deep, as a drier climate exists.8,000-10,000 B.C.: The modern Great Salt Lake emerges. A.D. 1776: Spanish explorers Escalante and Dominguez hear tales of a bitter sea that connects with Utah Lake. 1824: Jim Bridger and Etienne Provost become the first recorded white men to see the lake. 1843: John C. Fremont and Kit Carson explore the lake and visit Fremont and Antelope islands. 1847: First pioneers bathe in the lake. 1870: Lakeside and Lake Shore, the first two bathing resorts on the Great Salt Lake, emerge. 1873: The lake level reaches a historic high of almost 4,212 feet above sea level. 1890: Dropping lake levels decrease crowds to the lakeshore resorts. 1896: State gets ownership of the lake. 1903: Lucin railroad causeway cutoff is built near Promontory. 1963: The lake level drops to 4,191 feet above sea level. 1964: Most of the causeway to Antelope Island is built. 1969: The Antelope Island causeway opens. 1983: Rising lake levels close the Antelope Island causeway. (It was also temporarily washed out during numerous storms from 1969-1983.) 1986-87: Lake level almost reaches 4,212 feet. 1993: The causeway to Antelope Island reopens after reconstruction. 1997: The lake begins to rise again. 1999: The lake's level rises 1.5 feet since 1998. (from the Deseret News, Thursday August 5, 1999)		
LK3.E02 Sedimentary Core							
	LK3.E02.sx03	special exhibit	sedimentary core- related activities include: measuring, comparing; microscope station with rotating disc to view algae, ash, sands, oolitic sands, mud, bacteria; oolitic sand activities: viewing sands and sectioned sands under a microscope.				
	LK3.E02.ap01	activity prompt	microscope/magnifier prompt				
LK3.E02.gr01		graphic rail					
	LK3.E02.fp01	focus panel	Focus panel accompanies the core exhibit to discuss the how the core was collected and what we can learn from the core.	Once you know how to read the layers, a sedimentary core is a time capsule for the lake.	The core was collected as a test of drilling equipment. 1) Here is some metadata for the core: location: 41°5.713'N, 112°22.051'W water depth: 8.08m date cored: 12 August 2000 sediment interval: ~1.50m to 3.05m below the lake floor age estimate: this core hasn't been thoroughly dated, so we don't have high accuracy. However, based upon correlation with other cores and a few marker beds, the white layer at about 120cm depth likely dates to 11,600 years before present. There are finely-laminated sediments from the remnants of Lake Bonneville below that layer, and postglacial/Holocene lake sediments above. Rough guesses for ages of the top and bottom of the core might be 7-8,000 yr and 13-14,000yr, respectively.		with core diagram; map showing core location

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					2) there are no beds of pure salt; however, the pore waters are saturated with salts and several crystals have precipitated on the core surface. There may be a thin layer of the Mazama/Crater Lake eruption ash (7676yr) in this section, depending on whether the core covers that time interval, but it would take some work to find it--the Mazama doesn't stand out in the GSL cores. There are no other tephras present in this interval. The core is like a snapshot of the lake's history - some layers were left by lakes even older than Lake Bonneville. Earthquakes caused large areas of the lake bottom, especially near Fremont Island to become deep basins, essentially salt evaporation ponds, that quickly deposited salt to the thick sections we see in the cores. Above this, the lake Bonneville sediments occur, but are only a few inches thick. The lack of thickness of Bonneville deposits are contrasted by their occurrence three times. That is, Bonneville filled, then dried out at least three times!! The sediments are observed as clastic (sandy, salty, clay) layers clearly demarcated from the ash deposits above and below it. Ash layers represent volcanic activity. In the modern lake sediments found in the core, a mineral called anhydrite has become to form. This mineral is present in the lake today, but because of water and sediment pressure, it remains in solution. After the cores dried out and were released from pressure the anhydrite has formed large radiating crystals projecting from the side of the core.		
	LK3.E02.gc01	graphic captions	Graphic captions describe oolitic sands and how they form.		Oolitic sands, or ooids are small light-colored, oval grains. They are built up of layers of calcium carbonate around a central core. The core might be a mineral grain of a brine shrimp fecal pellet. They form because the lake is surrounded by limestone rocks; the calcium in those rocks dissolves in the lake water. When the concentration gets high, the calcium begins to precipitate out of the water around a core. Wind and water roll the pellet around the lake floor, and more calcium carbonate is added in concentric layers around the core. (see sectioned ooids) The largest ooids are found on the west shore of Antelope Island. Oolitic sands are a little slippery, because the egg-shaped pellets roll under foot. There are oolitic beaches in other areas (mostly warm ones like the Bahamas or Indonesia, where the water is shallow and warm, and there are lots of waves to roll the pellets around).		with diagram of oolitic sand formation; map of GSL showing where to find oolitic sands; photo comparing size of GSL ooids to Bahamas ooids, photo of oolitic sands
	LK3.E02.ap02	activity prompt	Activity prompts for oolitic sand activities.		compare oolitic sand and regular sand using hand lens; look at sectioned ooids; possible layers to find oolitic sand, brine shrimp eggs, sand, brine flies		
LK3.E03 Window							
	LK3.E03.gp01	graphic panel					

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	LK3.E03.fp01	focus panel	Focus panel to the left of the window describes geoantiquities	Geoantiquities are a natural record of Earth history that documents environmental change on local, regional and global scales.	Geoantiquities are large-scale records of Earth history. You can see some of them out the window - the ancient shorelines left by the lakes that preceded today's Great Salt Lake. This area has other geoantiquities, including the Stockton Bar, a ridge of gravel, is the largest remnant of Lake Bonneville's shoreline. The bar can tell us about climate conditions from 28,000 to today. Preserving geoantiquities is a challenge - they are often targeted by developers or extractive industry. Salt Lake's gravel and sand industry depends on geoantiquities - the ancient beaches and shores of GSL's precursor lakes. They form from ancient geologic processes. In the case of geoantiquities within the Salt Lake valley, most were formed by storms and geography acting on sediments within Lake Bonneville. Other geoantiques include glacial morranes.		
	LK3.E03.gi01	graphic image	photos of shorelines with shorelines labeled, photos of Stockton Bar, sand and gravel mining; http://www.geotimes.org/june03/feature_record.html - lot of good images here				
	LK3.E03.gc01	graphic caption					

NATIVE VOICES

Traditions persist and culture endures for Utah's distinctive five nations: Shoshone, Goshute, Paiute, Navajo, and Ute.

1. Native Americans are not merely a shadow of the past, but are living, breathing cultural groups whose distinct histories, traditions, tragedies, and triumphs inform their present and future in both tribal and mainstream life.
2. What is means to be Native in the twenty-first century.
3. Utah is home to five tribes with distinct histories, geographies, traditions, tragedies, and triumphs that inform the present and future in both tribal and mainstream life.

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
NV1.E01 Introduction			A wide entry opens the way to the gallery and is flanked on one side by an exhibit case arrayed with objects from across the North American continent and on the other by a series of large-scale photographs depicting Native people, both young and old. Focused sound elements feature voices of Native people greeting visitors in native languages and in English. At the end of the “welcome wall” as one turns into the outer circle of the gallery, a map of Native territories and language groups in North America reinforces the diversity among Native Americans and locates Utah as part of the Great Basin region.				
	NV1.E01.gi01	title wall w/ graphic image	A photographic mural composed of 12 large–scale photographs; 6 of adults and elders, 6 of children; to be produced by Kenny Blackbird in local communities.	Both old and new generations are the keepers and creators of history and tradition.			
	NV1.E01.ip01	intro panel	This exhibit provides a broad continent-wide context for the Native Voices exhibit experience. The space illustrates the vast numbers of diverse indigenous people across North America (including Utah) and the wide variety of language groups, material cultures, and traditional dwellings that have been created over time.		Hundreds of distinctive Native communities exist across the North American Continent. These and many more have been here for millennia. Language, homeland and material culture are among the features that distinguish each cultural group. Among many indigenous peoples, the cardinal direction east holds particular importance. East is the direction that symbolizes new beginnings, with the rising of the sun each day. The NV gallery has been designed at the eastern edge of the new building. Likewise visitors will be encouraged to circulate in a clockwise direction, toward the east, as they move into the space, much as one would in any number of Utah's indigenous households and gathering places, whether tipi, hogan, brush wikiup, or dance arena.		
	NV1.E01.ms01	mindset		For millennia hundreds of distinctive Native bands, tribes, and nations lived across North America many of which survive as intact political communities today. Language and custom connected broadly dispersed groups, while trading and raiding brought others together in both peace and conflict.	During pre-Columbian times, separate indigenous societies existed in a context of sovereignty and traditional culture. In the region that now encompasses the state of Utah, this continuum persisted well beyond the early days of a post-Columbian America.		
	NV1.E01.gi01	graphic image	A series of maps of original indigenous communities that indicate both original lands and reduced land bases				
	NV1.E01.gc01	graphic caption					

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	NV1.E01.av01	av	Motion- triggered audio offering greeting in different Native languages				
NV1.E01.ca01			Exhibit case with objects from across the north American Continent organized in geographic groupings of major culture areas: Arctic (baskets, harpoons, seal skin objects), Northwest (masks, rattles), California (baskets, horse dance sticks), Plateau (beadwork bandolier and other objects), Great Basin (baskets), Southwest (Earl Denet Katsina, Pueblo pots), Great Plains (beadwork objects), Prairie (beadwork objects), Woodland (beadwork and quillwork), Southeast (ribbon work).			Northwest Coast: Bella Coola 2435, a0945 Kwakuitl 2438, Haida 0944, Alaska 1025, Eskimo 0769, Makah 0787, Salish 0745, Tlingit 0753, 0790, 0948, 0958. California: Mission 0800, Maida 0949, Hupa 0748, 0798, 0799, Yakima 0751, Northwest California 0760, Pomo 0786 Achomawi 0796, 0957,Yokut 0797 Great Basin: Panamint 0952, 0794, Washoe 0339, Shoshone 0353, Goshute 0355, Paiute 0749, Ute 2437, Moapa 0795 Southwest: Hopi 2374-2378, 0158, 0774, 0801, 0946, New Casa Grandes 2439, Zuni 0744, 0775, 0777, 0811, 0812, 0816, 0818, 0819, a0820, Zia 0776, Santa Clara 0772, 0773, San Juan 0778, Havasupai 0788 Tohono O'Odham 0791, 0802, 0803, 0804, Pima 0792, Navajo 0805, 0806, 0807, 0808, Santa Domingo 0810, 0811, 0814, 0824, Isleta 0817, Pima 0950 Apache 0960, Yaqui 0942 Plains: Cheyenne 0956, 0764, 0956 Southern Cheyenne 0764,Arapaho 0765, Sioux 0755, 0766, Plains 0941, Assiniboine 0767, Apache 0746, Crow 0747, 0762, 0771, 0821, 0823, 0943, Osage 0752, Blackfoot 0763, 0959, Nez perce 0947 Northeast: Chippewa 0750, 0955 Iroquois 0754, 0756, 0757, 0759, 0953 Cree a0758, 0954, Potawatomie 0761, Mohawk 0768, Eastern Woodlands 0770, Ojibwa 0789	
	NV1.E01.ar01-ar07	artifact labels	group labels correlate to objects and identify seven geographic groupings		Geographic groupings: NW coast, California, Plateau, Great Basin, Southwest, Plains, NE		

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	NV1.E01.ms01	mindset		Native people typically rely on the materials available in surrounding environments and through trade to make things used in everyday life or for special occasions.	These objects reflect the lifestyles, cultures and beliefs of the people who made and use them. Readily available materials--porcupine quills in the Northeast and Great Lakes regions, buffalo hide on the Great Plains, colored clay in the Southwest, willow in the Great Basin, and whale baleen in the Arctic--typically comprise the basis for form and design of traditional arts. For hundreds of years, new materials, motifs, and forms have been incorporated into tribal arts through trade, intermarriage, and commerce. Shells and shell ornaments have made their way into the North American heartland since prehistoric times, through trade. Glass beads from Europe were used as currency between the earliest Euro-American traders and Eastern Indian tribes and were soon dispersed across the continent through extensive intertribal trade systems. "Hair pipes," long cylindrical beads used on Plains breast plates have their origins among east coast tribes and were originally made of shell as hair ornaments.		
					An entrepreneurial New Jersey man began to manufacture this form on a lathe, using cow bone, and soon these beads became ubiquitous throughout the Plains and into the Great Basin. Buttons obtained from Russian traders are as traditional as the imagery they are used to create. Today's powwow regalia incorporates mirrors, ribbons, beads from around the world, and feathers of all kinds. While materials and patterns evolve over time, the cultural and spiritual basis of many traditional objects remain unchanged. Katsina dolls, given to young Hopi girls are believed to embody virtues and characteristics that will be passed on to them.		
NV1.E01.gp01		graphic panel	a map of Native territories and language groups in North America reinforces the breadth, diversity, and long history of Native language and culture while helping visitors to locate themselves in Utah and the surrounding region. Introductory text provides a brief overview of the native people of Utah.				map of N. America and contemp. Tribes It seems to me that this and the general overview of Indian diversity, as noted in the intro above, can be conflated.
NV1.E01.gc01		graphic caption		155 native languages are spoken by approximately a half million native speakers in the US today. More than 115 are already extinct, with children actively learning fewer than 20 of the 155 languages still spoken.	Language and cultural groupings are concentrated in different geographic areas, but have migrated and been forced to move over time. At the time of the first European contact there were 280 Native American languages spoken in current US territory; 155 of these are still spoken today. There are 51 language families within the continental US, and 58 in all of North America.		
NV2 We Remember							

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	NV2.si01	section intro	Utah Indians share personal and tribal histories in a sequence that begins with ancient roots in the land, addresses outside influences and conflicts with non-Indians in their territory, and reflect on state and federal Indian policies.		Generational memory, as opposed to textbook histories of Native Americans in Utah, has been passed down through oral tradition and preserved through material culture. Family histories and stories carry cultural practices and traditions and serve as portals to sometimes painful and defining tribal moments--when entire communities were wiped out, people were relocated from homelands and tribes forced to leave behind their traditions and beliefs.		
NV2.E01 We've Always Been Here							
	NV2.E01.ms01	mindset	Aboriginal culture and sovereignty during pre-Columbian times	The Shoshone, Paiute, Goshute, Navajo and Ute people's homelands extend across the Great Basin and into the Rocky Mountains.	Prior to contact the indigenous people of the area now known as Utah lived in small extended-family groups that traveled broadly in the Great Basin, Colorado Plateau, and beyond following a seasonal round of resources. Identity and band affiliation was tied to extended family, home territory, and lifestyle. With relations on both the eastern and western flanks of the Rocky Mountains, the many bands of Utes engaged in broad exchange and affiliation with Plains peoples. Likewise, Shoshone bands extended north into what is now Wyoming and west into what is now Nevada, so Plains, Plateau, and Basin influences can be seen in their material culture. Tied linguistically to both Shoshone and Ute, Goshute and Paiute people were tied more closely to the Great Basin and remained in this expansive territory except when moved forcibly by Ute raiders. Navajo country extended along the southern edge of Utah and deep into Arizona as is does today, and as today, Navajo communities were organized according to their clan system.		A map may be a useful screened-back graphic here.
	NV2.E01.fp01	focus panel	Description of language groupings among Native people in the Great Basin.	Language is the primary conduit for transmission of tradition and culture.	Language is the primary conduit for transmission of tradition and culture. Among the native people of Utah and surrounding regions, shared linguistic roots of four of the five major tribes may relate to other forms of shared cultural tradition The languages spoken by native people of Utah and the surrounding region fall into two language families: Uto-Aztecan and Athabaskan. On the Numic branch of the Uto-Aztecan language family tree, are Ute, Paiute, and Shoshone. So, while each of these languages (as well as Goshute, which is a dialect of Shoshone) are distinct, there are deep linguistic connections among them. Native speakers are able to understand components of these related languages. Navajo is a language of the Athabaskan language family tree and falls within the Apachean language branch of the tree. Thus, there is no linguistic connection between the numic speakers of the region (Ute, Paiute, Shoshone, Goshute), and the Navajo. Likewise, family and clan structure and tribal origin stories are very different between the Navajo and the other "Utah" tribes.		If we'd like we can include a tree structure to illustrate this, we can illustrate with simple words, or we can go without a graphic here.

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	NV2.E01.sp01	story panel	It is important for Navajos to know who they are and what clan they come from.	In the Navajo way, a person introduces themselves based on both their maternal and paternal clan. Navajo children are "born to" the mother's clan and take her clan name and are "born for" the father's clan. This way, now matter where they are in time or space, Navajo people know precisely who they are and where they come from. The clan that never ends is the maternal clan, the male side changes through marriage.	From first world to fourth world. Origin of Navajo and explanation of clan system, both of which connect them inextricably to the land. Changing Woman is the daughter of Mother Earth and Father Sky and the spiritual mother of all Navajos. She gave birth to twins Monster Slayer and Born of Water. They killed all the monsters on earth. When it was safe Changing Woman and her husband the Sun traveled to earth and Changing Woman created the four original clans of humans by rubbing the skin of her breast, back and under both arms. The Four clans are Towering Clan, Mud Clan, One Who Walks Around Clan and Bitter Water Clan. Navajo society is matrilineal so the first clan for all Navajos is the mothers' clan The Navajo or Dine' have an oral tradition of passing on their beliefs from generation to generation. The Navajos consider their homeland within four sacred mountains which are Mt. Blanca to the East, Mt. Taylor to the South, San Francisco Peaks o the West and Mt. Hesperus to the North. Present Navajo land is in New Mexico, Arizona and Utah.		
	NV2.E01.sp02	story panel	Goshute story	The Goshute remember a different landscape before white contact.	Story 2: Goshute: Genevieve Fields has stories that have been passed down through her family describing a very different Great Basin landscape before contact, in which tall grasses rather than sagebrush covered the land. There is still the remnant of an antelope corral from the long-ago antelope drives. Goshutes saw the last buffalo in the 1920's.		
	NV2E01.gi01	graphic image	Photograph of ancient antelope corral at Ibapah (photo to be taken by Kenny Blackbird)				
	NV2.E01.gc01	graphic caption					
	NV2.E01.sp03	story panel	Shoshone story		Story 3: Patti and Helen Timbimboo tell of the last Shoshone rabbit hunt in 1928.		
	NV2.E01.gi02	Photograph-	Shoshone Chief Sagwitch's wife wearing a rabbit skin robe				http://www.koffordbooks.com/pretty/released/sagwitch/stereo2.jpg
	NV2.E01.gc02	graphic caption					
	NV2.E01.ic01	inset case	rabbit robe for a child-commission from Brenda (Paiute)			Rabbit skin robe by Brenda	
	NV2.E01.ar01	artifact label		Weaving is a tradition shared by Paiute, Shoshone and Goshute people.	It is a Paiute piece, so it's id label will need to address the broader use of this weaving technique among Shoshone, Paiute, and Goshute people. We have additional images of rabbit-skin-wearing folks in our archives.		
NV2.E02 Contact							

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	NV2.E02.ms01	mindset	Displacement of Native peoples began with the arrival of Fur trappers in the Great Basin region from 1824 to about 1840. Mormon settlers arrived in 1847.	As elsewhere in North America, changing federal Indian policies that emerged over time resulted in conflicts across Indian Country. These policies removed, relocated, dislocated and displaced Native people from their homelands and disrupted traditional lifeways.	By the 1600s, the nomadic Utes and the southerly-situated Navajos came into contact with Spanish traders and their envoys. Combined with trade of Plains and Pueblo goods, Spanish horses and other goods expanded the raiding and trading capacity of Utes (or Yutas as they were known by New Mexicans) in Utah and Colorado and brought silversmithing to the Navajo. By the early 1800s, Utah's other indigenous people began to see the impacts of conquest from the east. Surely and steadily the flow of trappers, traders, explorers, miners and settlers flowing westward reached the western slope of the Rockies and altered the lives of the indigenous people of this region forever. As Mormon and non-Mormon settlement expanded across the region, the broader influences of Federal Indian policies impacted indigenous life in Utah. Ultimately, removal from tribal lands, dislocation from and destruction of natural resources, unhappy alliances and forced cohabitation among tribes was the norm. Like other native nations across the continent, the past one hundred-fifty years of Indian policy have shaped the economic, political, and psychic reality of Utah's tribes. Forrest Cuch refers to this as "intergenerational grief," a phenomena in which the suffering of one's ancestors—when not acknowledged beyond one's own community, when denied in official histories, ignored in school texts, or redefined in popular culture—continues to cause suffering among each new generation. For example, when a Ute child sits in school and hears the stories of his family dismissed or disparaged, his entire identity is challenged, his ability to learn stifled, and his self-esteem trampled. Cuch explains, "If native people had a written language earlier, history books might have incorporated the viewpoints of the indigenous peoples" (American Indians of Utah).		

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	NV2.E02.fp01	focus panel	The Ute are known for being powerful and fierce horsemen.		As early as the 1600s, Utes encountered Spanish explorers and their Indian envoys who brought with them horses from Spain. For an already highly mobile people, the acquisition of the horse was an expansive, almost magical gift. Mounted horsemen can be seen in early rock art in Ute territory. It made it possible to carry more belongings, to hunt greater numbers of buffalo, and to connect with tribes from greater distances. Horses became the most prized possession of the Ute people and they had great herds of horses used for hunting, raiding, transporting supplies, and as a status symbol. Utes have long been expert, fearless horsemen who can ride in the rugged mountains and high valleys where others dismount and lead their horses. The Utes became known as fierce and powerful horsemen whose mountainous homeland provided abundant resources and a position from which to defend an enormous territory. Their economic stature grew as they raided Paiute and Goshute communities for slaves to trade with the Spanish, followed by a period of lucrative fur trading.		Rock art image at Ute reservation by Kenny Blackbird.
NV2.E02.ic01		inset case					
	NV2.E02.ar01	artifact label	saddle blanket--see below. Artifact label will reference the trade blanket along with information about the saddle style.		Women wove coarse saddle blankets with no pattern so they could sell them quickly. Later the quality of saddle blankets would improve dramatically and weavers would incorporating twill patterns.	Navajo saddle blankets a2311	
	NV2.E02.ar02	artifact label	Ute saddle		In the 1600s horses came to the Utes via trade through their compatriots (although it's never entirely clear whether there was direct contact with Spanish conquistadors as well, this early). Then, by 1776, the Dominguez-Escalante expedition passed through Ute territory, so this does make sense as a contact story.	Ute saddle a0409	
	NV2.E02.pm01	photomural	Historic image of Ute men on horseback (Rights obtained, b/w print in hand)				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	NV2.E02.fp02	focus panel	Mormon arrival and religious conversion	With the arrival of Mormon settlers in 1847, a complex and often contradictory relationship began to develop with Native people inhabiting the land. Land was taken from Native Americans to make way for the building of religious communities simultaneous to Mormons seeking to convert these same people.	The arrival of Mormons in the Desert Territory in 1847 added a new and pervasive layer of outside influence and increased pressure, particularly for those tribes living in the northern parts of the region. The church's approach to the native population was inconsistent and erratic. As settlers attempted to take Indian lands, resistance could alternately lead to a command from church leader Brigham Young that his army "crush them," or to no retaliation at all—indeed to sharing of food in some cases. Young has been famously quoted as saying "it's cheaper to feed 'em than fight 'em" (qtd. Ward, Geoffery C., The West, 159). This confusing and conflicting approach was based in large part on the church's belief that indigenous people were in fact the lost tribes of Israel, or the "Laminites." Thus, in the midst of decades of conflict and deadly battles, a patina of paternalism overlaid many Mormon/Indian relations—a situation that continues in various guises today.		
	NV2.E02.sp01	story panel	The Blackhawk War and Ute removal recounted by Roland McCook.	Ute story	In 1861, President Lincoln set aside land in the Uintah Valley of Utah, where Brigham Young had procured land and expected all of "his red children" to settle. In 1863, in the face of poverty and failed farming experiments, Tumpanawach, Pah Vant, Parianuche, and Yamparicka Utes met in Central Utah where Black Hawk led a series of raids known as the Black Hawk War of Utah--the last guerilla campaign against removal.		
	NV2.E02.sp02	story panel	Lora Thom recounts the Mountain Meadow Massacre and its repercussions.	Paiute story	Paiute communities often had contentious and contradictory association with Mormon settlers, including the events that led up to and followed the Mountain Meadows Massacre.		
	NV2.E02.sp03	story panel	Leland Pubigee recounts the Bear River Massacre.	Shoshone story	Among the Northwestern Band of Shoshone, the historical moment that continues to define tribal consciousness is the Bear River Massacre. With the deaths of over 300 tribal members and loss of their Bear River Valley, the Northwestern Band faced a new way of life with the oversight of their Mormon neighbors, and the successors to their land. The Northwestern Band now includes 456 enrolled members, many of whom are active members of the Mormon Church. As Patti Timbimboo Madsen, Cultural Resources Manager for the tribe relates, "The people who became the Northwestern Band of Shoshone had to adapt to the changes or die…"It's easier to take a group away from their environment--it makes them dependent." (consultation notes, 2006)		
	NV2.E02.gi01	graphic image	Photograph of Bear River Massacre Site/Northwestern Band Cemetery by Kenny Blackbird.				
	NV2.E02.gc01	graphic caption					

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	NV2.E02.sp04	story panel	Story of telling of the Long Walk- impact on 2nd generation	Navajo story	The Long Walk In 1863, under the direction of the US Army, Kit Carson rounded up the Navajo people for a forced removal to Bosque Redondo, or Fort Sumner (Hwééldi to the Navajo). His approach was a scorched earth policy—livestock were killed and home and field burned as the people were driven on foot for 300 miles. At least 200 died along way. Between 8,000 and 9,000 people were settled on a 40 miles (104 km_) square area, with a peak population of 9,022 by the spring of 1865. Some Navajo escaped the treacherous journey, hiding with White Mesa Utes and San Juan Paiute people on and around Douglas Mesa.		
	NV2.E02.gi02	graphic image	The Long Walk, public domain historic images available from SI anthropology collections.				
	NV2.E02.gc01	graphic caption					
NV2.E03 Assimilation							
	NV2.E03.ms01	mindset		Forced assimilation has taken many forms. From early removal policies of the 1800s, to boarding schools to which native children were sent in order to "kill the Indian, save the man" (Cpt. Richard Pratt on the Carlisle School solution) government policies have attempted to fix the so-called "Indian Problem."			
	NV2.E03.fp01	focus panel	focus on boarding schools	Boarding schools have a huge impact on Native languages and take children away from their homes and families for extended periods of time.	The government sought to have Navajos assimilated into white society. Children were taken from their homes and sent to boarding schools. They had to wear white society attire, have their hair cut and not speak their native language. Boarding schools continued into the mid 1900s. Today there are schools on the reservation run by the Bureau of Indian Affairs that include some boarding schools (Teec Nos Pos and Aneth) due to the great distances to travel.		
	NV2.E03.sp01	story panel	Many did not want to go to boarding schools.	Navajo story	Navajo: Stephanie Holly's mother went to Phoenix Indian School though she did not want to go. She went in her Indian clothes but was made to change into non-Indian clothes and wear her hair during the school year. Often children were separated from their families for four years because they could not afford to pay for transport home in the summers. Other boarding schools where Indians were sent include Brigham City, Headway, Oregon and Sherman Institute in California. The boarding school arrangement was part of the Bosque Redondo treaty signed on June 1st 1868.		
	NV2.E03.gi01	graphic image	historic image of boarding school				Brigham Indian School (source: American West Center)

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	NV2.E03.gc01	graphic caption			Today there are schools on the reservation that include some boarding schools due to the great distances to travel. Teaching Navajo language in schools is left mostly up to families.		
	NV2.E03.sp02	story panel	Many attended boarding schools fearful of what would happen if they didn't.	Shoshone story	Shoshone: Patty Timbimboo said that when white people approached their homes when she was a child adults would tell her "Run and hide. They'll kill you or steal you."		
	NV2.E03.fp02	focus panel	focus on religious assimilation-		During the years of the Bear River Massacre, conflicts in the region continued, treaties were signed and Mormons settled in the Shoshone's last mountain valley. The Mormon's took a paternalistic stance toward the displaced Indians, however, providing food, lessons in farming, and the doctrine of the church. Many Mormons believed that religious affiliation would help assimilate the Shoshone overall and encourage them to help build a religious community. By 1880, the settlement at Washakie, Utah was well established. (adapted from UMNH materials)		
	NV2.E03.sp03	story panel	Experiences of religious assimilation had many different long term results and lasting impact.	Goshute story	Source material for stories related to the Goshute experience of religious assimilation: Genevieve Fields (Indian Advisory Committee Member) Christine Steele (former Indian Advisory Committee Member and collaborator on Utah's First Nations) Julie Yupe Evonne Evening Chrissandra Murphy Jeanine Hooper Mel Steele Edwin Clover Melissa Oppenheim Also, Kenny may have recorded a pertinent interview for this story.		
	NV2.E03.fp03	focus panel	focus on property/ ownership assimilation		The Ute Indians lived on the plains and in the mountains of an area covering about 150,000 square miles, what we now know as the Great Basin and Colorado Plateau This land included hunting grounds, places of spiritual importance, and the territories of the seven Ute bands. The Utes lived off the land and hunted the many animals in the area, which provided them material for clothing and homes. They lived in tipis and made their homes across the area of what is now Colorado, Wyoming and Utah. When white settlers and homesteaders arrived, they brought with them very different ideas about the land and what they saw as their right to own, cultivate and use natural resources. They saw the wilderness as something to be conquered rather than respected for its life sustaining resources. The settlers, explorers, miners and traders wanted the Ute people to become herders and farmers. The Ute people believed if they stayed in one place they would starve. This was a fundamental difference between Native Americans and non-natives, and the cause of great clash.		

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	NV2.E03.sp04	story panel	White Mesa loss of land, has led to a loss of culture--contacts Jeanette Badback and Gwen Cantsee	White Mesa Ute	Biggest issues for White Mesa: losing culture. Jeanette, who has taught Ute language, notes that kids have lost their identity. They're looking for something that fits…to be something they're not. Hip hop music, gangsters, graffiti, but no drug problem…yet. It's that old thing of trying to fit in that everyone goes through. For the middle-aged generation now at White Mesa, they went off to boarding school, tried so hard to fit into Anglo culture and language that they didn't use their language—now many of them have passed away because of alcoholism, and many can't teach traditions to their kids because they let them slip away. It's the grandparents who still retain traditions and language.		Request photos from Jeanette or Gwen--yearbooks ca. 1970s.
	NV2.E03.pm01	photo mural	tbd				
	NV2.E03.gi02	graphic image	photo of encampment of Northern Shoshone from Washakie, 1906. (UMNH Collection)	Mormon arrival created new communities			
	NV2.E03.gc02	graphic caption					
NV2.E04 Reorganization and Termination							
	NV2.E04.ms01	mindset	Termination was the governments response to the perceived request of more freedom by Native Americans. After having grown dependent on government policies, the Indian community protested this resolution claiming that the US government had forced them to become dependent on the government for subsistence. Without this subsistence many Indians suffered deprivation and the accompanying misery generated by the termination policy. The termination policy also resulted in the termination of more than fifty tribal governments when the federal government no longer recognized the nation status of their tribes.	The US Governments attempt to "reorganize" Indian life and culture resulted in mass dislocation and ultimately, isolation.	Termination is the period of time spanning about twenty years, when the policies and subsidies instituted by the Bureau of Indian Affairs in an effort to assimilate Native Americans, were revoked. The period of the 1930s through the 1960s marked the end of failed attempts by the government to assimilate Native Americans. Through the Indian Reorganization Act of 1934, tribes were urged to move toward self-governance. The act "symbolized a new relation between the Indians and the Indian Office which the Commissioner hoped would evolve. In lieu of administrative absolutism there would be developed between government officials and Indians a partnership in the determination of many policies. Instead of the superintendents or Washington officials deciding everything, there would be an area for local self-government. If the Indian councils proved capable and faithful to their trust, they would be delegated additional power by the Secretary.		

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					A short 15 years later, in 1953, Termination acts were administered on a tribe by tribe basis, in order to assimilate Indian people into mainstream society. Most included the end of federal recognition and all the federal aid that came along with being federally recognized tribes. Subsidies were terminated and people were left to fend for themselves. "A total of 109 tribes and bands, totaling over 11,000 Indians or 3% of the total Indian population, across the country were terminated during this time and lost their status as "recognized" and sovereign dependent nations.[3] The termination of these tribes extinguished traditional rights to land, hunting, and fishing as well as disbanded the tribe as a whole and incorporated them as official American citizens."--Wiki "For Native Americans who favored certain aspects of termination programming, the movement was optimistically envisioned as a catalyst for enhanced Indian autonomy and control over tribal resources and increased liberation from the heavy hand of federal paternalism. Government proponents of termination likewise viewed the policy as aimed toward Indian "freedom," but their view of self-determination was predicated on the ultimate goal of privatizing Indian resources through the wholesale liquidation of the reservation system, the Bureau of Indian Affairs, and the very concept of tribalism itself. As so often has been the case in federal Indian relations, the two sides largely talked past one another, and little common ground could be found."--Law and History Review.		
	NV2.E04.qt01	quote	laws and policies from an Indian perspective	There were many different approaches to fixing the Indian problem	Two perspectives on how the Indian "problem" was dealt with by the government.		
	NV2.E04.qt02	quote					
	NV2.E04.fp01	focus	Focus on laws and policies		tbd- This should outline the trust relationship between the federal government and Indian tribes, which has been a highly dynamic platform upon which multiple approaches have been played out over time. I'll look for a good reference to help guide this. (BM)		
	NV2.E04.sp01	story panel	Story 1: Travis Parishant	Paiute story	In the late 19th century, the Paiute Bands in southern Utah coalesced into five Bands: the Shivwits Band, Indian Peaks Band, Kanosh Band. Koosharem Band and Cedar Band. Reservations were established between 1903 and 1929 for all but the Cedar Band whom the federal government overlooked. In 1954, the Bands were terminated from federal recognition, with the exception of the Cedar Band who received no federal assistance and consequently suffered de facto termination. The Tribe became ineligible for any federal assistance for 26 years.		

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	NV2.E04.sp02	story panel	Story 2: Roland McCook, Donna Land Moldanado	Both sides of the story…	Ute Partition and Termination Act of 1954 terminated the Federal supervision and Trust over the mixed blood Uintas of Utah. It was amended in 1956, 1962, and again in 1975. This act has led to ongoing litigation that continues today. The Act defined full-bloods as those tribal members possessing one- half degree of Ute Indian blood and a total of Indian blood in excess of one-half a degree, and defined mixed-bloods as those members who did not possess sufficient Ute or Indian blood to fall within the definition of full-bloods and those full-bloods who chose to be designated as mixed-bloods...The Act provided that after distribution, mixed-bloods could dispose of their interests in the assets they received subject to the approval of the Secretary for a period of years, and thereafter without federal supervision. The United States actually ended its supervision over the affairs of the mixed-blood Utes and terminated its trust relationship with them on August 24, 1961.		
	NV2.E04.sp03	story panel	Story 3: Navajo Code Talkers	The 2nd World War and Indians	Makes more sense to place this story here--the war effort and the goal of overcoming enemy propaganda about Indian/government relations was one of the issues that spurred on the Reorganization Act	Navajo Code Talker Photograph	
	NV2.E04.gi01	graphic image					
	NV2.E04.gc01	graphic caption					
	NV2.E04.ic03	inset case				Paiute vest a2372	
	NV2.E04.ar01	artifact label		This vest was made for the local Indian agent at Shivwitz, whom this band of Paiutes deemed to be fair, thus the nickname no cheet'em.	Description of Shivwitz vest with "No Cheet'em" embroidered on it.		
	NV2.E04.pm01	photo mural	tbd				
	NV2.E04.sx01	special exhibit	Flipbook with primary source documents related to the termination period.		This will include treaties, legal briefs, policy papers, and photographs that we will collect from various archives.		
	NV2.E04.ar01	artifact labels	identifies primary source materials			a3125- documents tbd	
	NV2.E04.ap01	activity prompt	encourages visitors to look through flipbook				
NV2.E05 Living in Cities							
	NV2.E05.qt01	quote-tbd					

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	NV2.E05.ms01	mindset		Today, many Native Americans live in cities- both by choice and because they, or their families were removed or relocated from their tribal lands.	In the last half of the 20th Century, a government program that was little known at the time and is largely forgotten today created the largest movement of Indians in American history. The final scope and meaning of this massive social experiment is still impacting native peoples today." In 1950, the average Native American on a reservation earned $950. The average black person earned $2,000, and the average white person earned almost $4,000 — over four times more than Indians. So, in 1952, the federal government initiated the Urban Indian Relocation Program. It was designed to entice reservation dwellers to seven major urban cities where the jobs supposedly were plentiful." Native cultures and lifeways that had been geographically and culturally distinct until this point, were brought together in urban settings by Native people faced with the challenges of an unfamiliar environment and looking for ways to identify. Relocatees were supposed to receive temporary housing, counseling and guidance in finding a job, permanent housing, community and social resources. The new migrants also were given money to tide them over on a sliding scale based on the number of children in the family. A man, his wife and four children got $80 a week for four weeks. That's what they were promised. Some found that the promises were not kept. Not every relocatee found a job, and those that did were generally at the lower end of the economic ladder. Others succumbed to alcohol and those who were accustomed to drinking in public on their home reservations got into trouble with the law when they drank on city streets. Many more were simply homesick so far away from their families and familiar landscapes. Still more decided to return to their reservation. But over the years, it's estimated that as many as 750,000 Native Americans migrated to the cities between 1950 and 1980. Some came through the Relocation Program. Others came on their own. The juxtaposition of intertribal Indians within city centers led to new alliances and a new era of activism and AIM was born.		

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	NV2.E05.fp01	focus panel		Salt Lake City was a relocation center in the 1950s and 1960s.	Navajo and Hopi men were among the first people relocated when the BIA recruited them for agricultural and railroad work. Soon after, job placement and relocation offices were created in cities across the country, including Salt Lake City. The government saw relocation as the policy fairest to Native Americans that would encourage them to live without federal supervision and have more control over the quality and direction of their own lives. For most, the relocation experience was traumatic and disorienting. For the first time, people encountered elevators, telephones, and structured work environments. For those without education, the choices of livelihood were limited. Those who were successful were mostly young people with some college education. The BIA relocation program originally provided transportation, job placement, subsistence funds until the first paycheck, and counseling. In 1956 Public Law 959 added vocational training to the program. Participants, mostly between the ages of eighteen and thirty-five, received two years of benefits for either on-the-job experience or vocational classes. Typically, Indians working in factories on the reservation received apprenticeship provisions, and relocated individuals received vocational training and for those who qualified, counseling services. The BIA relocation program was controversial. Some believed that industrial jobs freed Indians from BIA control, exposed them to improved education, and provided a means to end Indian poverty. Others believed that the program forced Indians to leave reservations without improving living conditions or access to comprehensive job training. One distinct result of relocation was that the disadvantages Native Americans faced vs. other minority groups became much more visible in urban settings, rather than rural outskirts.		
	NV2.E05.sp01	story panel	Relocation story that speaks to the diversity of Indian people in SLC	Salt Lake City is home to urban Indians from across the US--as many as 70 tribes are represented in Utah's Indian population.	Conversations with folks via Indian Walk-in Center, Gayle Russell, Dina Ned, Nola Lodge		
	NV2.E05.sp02	story panel	Relocation story that speaks to the choice of moving from the reservation to the city.	Navajo story	There are a lot of urban Native Americans, and those raised off the res; those who live and work in cities and want to learn and get degrees and jobs and come back to help their people…but most don't... (Stephanie Holly, interview, 4/13/06)		
	NV2.E05.sp03	story panel		Activism in urban settings (AIM) or to city for college then back to the rez.	Conversation Donna Land Moldanado; or Anthony Shirlet--left the rez for college and has remained in the city) or Larry Cesspooch at IAIA, then back to the Rez.		
	NV2.E05.ic01	inset case			Piece of contemporary Navajo folk art that depicts Indians in contemporary clothes.		
	NV2.E05.ar01	artifact label					

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	NV2.E05.pm01	photomural	Relocated Native Americans in an industrial work setting in the city		Refer to archives at the Denver Public Library for Navajo image.		Image in Hand.
	NV2.E05.gi01-gi05	graphic image	relocation posters and advertisements (American West Center as resource)				
	NV2.E05.gc01-gc05	graphic captions					
NV3 Being Indian Today							
	NV3.si01	section intro	This concluding exhibit speaks to the efforts of Indians during the last quarter century to reverse the pressure of assimilation by reestablishing viable, separate sovereignties in Indian country. This section also looks at what it means to be a Native American today and how traditions persists and change over time. How does tradition get successfully passed on? Native people speak to these themes in first-hand story panels that address issues such as healthcare, preserving native languages, being a teenager on a reservation today, being a teacher on a reservation and of students in a city school, living in the city and participating in traditional dance and music performance, generational differences, etc.		Photography by Native Americans and first-person accounts document these revitalization efforts, interpret contemporary issues and describe moments of healing and celebration among Native Peoples. Unlike the entry sequence this area is comprised of portraits and narratives that collectively paint a picture of contemporary Indian life, tradition, celebration and (struggle for) sovereignty.		
	NV3.E01.sp01	story panel	Old songs are lost-they have not been recorded or written down.	Goshute story	Loss of traditions and language-the pine nut dance is no longer held on a yearly basis. Genevieve Fields heard them when she was young but does not have a way to find them again.		
	NV3.E01.sp02	story panel	Someone to speak to the uniqueness of language and describe how languages define the identity of a people.				
	NV3.E01.sp03	story panel	A speaker to describe the inter-relatedness of language, perhaps a dual-language speaker who can tell the story of how she/ he came to know both.				
	NV3.E01.sp04	story panel	An elder who is one of the few fluent speakers of a language, describing their fear about the loss of language.				
	NV3.E01.sp05	story panel	A young person who lives in the city, and attends school where a program to teach native language has been recently introduced. Why is it important to them to learn their language?				
	NV3.E01.sp06	story panel	An archivist/ anthropologist who works at the Center at the U of U recording and translating stories.				
	NV3.E01.sp07	story panel	A scientist involved with research related to the elderly and access to adequate healthcare.				

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	NV3.E01.sp08	story panel	A Goshute teenager from Ibapah describes their everyday life.	"We don't still live in tipis, cuz we never did live in Tipis." The teens at Ibapah created an entire presentation about life as a Goshute Indian.			
	NV3.E01.sp09	story panel	Skull Valley Goshute addresses concerns about nuclear waste				
	NV3.E01.sp10	story panel	Ibapah Goshute describes how troops changed names into shorter versions.				
	NV3.E01.sp11	story panel	Shoshone voice describes their participation in ceremonial dance. (Great to have a photo of them in typical clothes and dress for dance)				
	NV3.E01.sp12	story panel	Tribal chairperson				
	NV3.E01.sp13	story panel	Northern Ute participant in contemporary Bear Dance				
	NV3.E01.sp14	story panel	Paiute participant in contemporary Restoration Dance				
	NV3.E01.sp15	story panel	Shoshone handgame gathering at Fort Hall or Brigham				
	NV3.E01.sp16	story panel	Shoshone- contemporary issue of Diabetes				
	NV3.E01.sp17	story panel	Shoshone- Mae Perry has been involved in revitalization efforts.				
	NV3.E01.sp18	story panel	Horserace in August- Navajo				
	NV3.E01.sp19	story panel	Skull Valley- Nuclear Waste Story				
	NV3.E01.sp20	story panel	Additional stories collected by Kenny Blackbird, to be transcribed.				
	NV3.E01.sp21	story panel	Image of White Mesa Bear Dance by Steve Trimble				
	NV3.E01.sp22-30	story panel	tbd				
	NV3.E01.ic04	inset case				Mary Black Basket a0168	
	NV3.E01.ar01	artifact label	Mary Black's basket entitled "Lifeways" depicts images related to Mary's life on the Navajo reservation.	Against all odds, basketry traditions continued on Douglas Mesa into the 21st century. Each basket created has a story, and Mary says, "If we stop making the baskets, we lose the stories."	Mary Holiday Black's family has lived for generations on Douglas Mesa in Monument Valley. Those who hid in the canyons and mountains to avoid the Long Walk settled on Douglas Mesa, Allen Canyon, and Paiute Canyon where interaction between friendly Utes and Paiutes let to marriage ties, and sharing of skills and knowledge that continues today. At Douglas Mesa, where her family continued to create ceremonial baskets for their medicine men, Black follows in the footsteps of a long succession of Navajo basketmakers, carrying their skills from antiquity forward.		
	NV3.E01.qt01	quote	quote makes transition from stories to next section		Possibilities: "There are certain advantages the Indians have. We have a place, a sense of belonging." David Box, Ute or "Some of the things Indian people feel are not written in books, they are written in their hearts." Edie Box, Ute		

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	NV3.E01.fp01	focus	Languages spoken in the Great Basin region can be broken down into three geographic regions.	Native languages are endangered in the US, making the preservation and recording of these languages and the people who speak them, particularly important.	The Numic language family can be broken down into Western, Central and Southern parts. The Westernmost wedge in Nevada-Oregon, bordering on California, consists of the California language Mono-Paviotso; its cogeners in the Basin & into Oregon & Idaho is N. Paiute-Bannock (so, that's Western Numic). Some of it is north of the Basin above the Snake River Valley & into West-Central Oregon. Central Numic; it has the California language: Tumpisa-Panamint + the Basin chain of Nevada dialects including: Shoshoni-Gosiute, plus the break-away Comanche (the latter now in Oklahoma, after having ranged the Southern Plains since the 1700s as powerful equestrian nomadic raiders). Shoshoni itself (C. Numic) reaches into N. Idaho (Lemhi) & Wyoming (Wind River Reservation). At one time it could be found as far north Saskatchewan, Canada. They also occupied the Yellowstone Park area. Southern Numic: California has Chemehuevi (now sharing the Colorado River Reservation with Mohave, a Yuman Language). Eastward in the G. Basin-Colorado Plateau: Southern Paiute-Ute, the latter (Ute) is found on reservations near the 4-corners region in Colorado, plus the "Uintah Basin" at Ft. Duchesne (near the town of Roosevelt, in northeast Utah)		
	NV3.E01.av01	av	language based interactive av that offers visitors the chance to learn and repeat words in different Native languages.		Visitors type a word or select from a dictionary-like list of words, push the translate button and see the word projected on the monitor in several different Native languages while a native speaker pronounces the word out loud. Visitors can see and hear similarities and differences among languages and try to repeat the new word. A simpler variation of this could be a flash card-based game.	Reference: :Dr.s Mixco and DiPaolo at the U are currently working on a talking dictionary of the Shoshone language.	
	NV3.E01.ap01	activity prompt					
	NV3.E01.sx01	special exhibit	Feedback notebook prompts visitors to respond				
	NV3.E01.ap02	activity prompt	Visitors are encouraged to write a response to a prompt of "Who are you?" Or "Where are you from?"				
NV4 Homeland Photomural			Homeland images that share the same horizon line and objects will be inset into cases of each of the Utah's tribes. Objects highlighted at cutouts in case: Ute rasp, Shoshone bustle, Goshute seed jar, Paiute basketry hat, Navajo water carrier				
	NV4.E01.qt01-qt05	quotes	5 Quotes reflect people's relationship to their homeland		Interviews conducted by UMNH in 2006 may serve as source materials for these quotes. Becky Menlove is a resource.		
	NV4.E01.pm01-05	photo mural	5 photomurals reflect the landscape of different native homelands				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	NV4.E01.gc01-05	graphic captions	identify different native homelands				
NV5 Utah's Tribes							
	NV5.si01	section intro	The five tribes prominent in Utah today are featured in this section.	Native American culture has persevered in the Great Basin.			
NV5.E01 Ute							
NV5.E01.ca02							
	NV4.E01.ar0	artifact labels	case highlight object	Ute-Bear Dance rasp		Ute- Bear Dance rasp- a0462, White Mesa Ute (within the Ute case)-flute,	
	NV5.E01.ms01	mindset	Ute (all bands)		For hundreds of years before Europeans arrived Ute home land was the Eastern Great Basin and Western Rocky Mountains. Today the Ute people lived on three reservations in Utah and Colorado. The Southern Ute tribe have their headquarters in Ignacio, Colorado; the Northern Ute tribe is one the Uintah and Ouray Reservation with their headquarters in Duchesne, Utah; and the Ute Mountain Ute have their headquarters in Towaoc, Colorado. The Uintah and Ouray reservation consist of the Uintah, Umcompahgre and White River Bands. The White Mesa Utes who reside in southeastern Utah belong to the Ute Mountain Ute tribe. When the Spanish came into contact with the Utes they called them Yutas from which the state of Utah got its name.		
	NV5.E01.fp01	focus panel	traditional Ute ways of life relied on their environment.		Before white contact Utes hunted big and small game and gathered wild foods moving from place to place with the seasons. Shelers were ramadas with pole frames covered with tule or juniper bark. Northern groups also used skin tipis to protect from the cold. Utes were experts in tanning hides and made beautiful clothing, footgear and carrying bags. Soft strips of rabbit skin were woven into warm robes. In higher elevations pine nuts were gathered in conical baskets, then parched and winnowed in fan shaped baskets. Among other important food sources that utilized baskets were berries, seeds, roots and in some other areas fish traps. Ute Mountain Ute people wore fiber shirts and sandals. Globular shaped water jugs were woven and pitched on the inside to make them water tight. Baskets were made for many purposes including gathering, winnowing, parching, carrying and storing water.	Water bottles a0411, a2773, Baskets- bowls, lidded, large carrying- a0413, a0414, a0415, a02770, a02771, a02772	
	NV5.E01.ar-	artifact labels	artifacts connected to focus panel and the use of environment				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	NV5.E01.fp02	focus panel	trade and raids sustained the Ute people and provided them with beads and horses- both vitally important.		In the 1750s fur trappers and then traders appeared. The Utes traded furs for food, wool blankets and trinkets. By the mid 1850s glass pony beads were brought form Europe as trade items for the Indians. Beads replaced shells and teeth for decoration. The Utes became expert bead workers decorating clothes, moccasins, horse blankets, cradleboards and beaded blankets. Utes first acquired horses through trading with the Navajo and Comanche, not directly from the Spanish. Saddle blankets were also acquired from the Navajo and through trading and raiding with the Ute's neighbors.		
	NV5.E01.ar04-07	artifact label	objects related to horse culture of the Ute that they traded for			saddle a0410, gloves a0461, painted hide of encampment a0459	
	NV5.E01.ar-	extended artifact label	parfleche bag used along with horse gear--painting precedes beadwork.		Richly painted parfleches were made of finely tanned leather from bison, elk or later cattle. These served as storage for clothing, utensils and tools.	parfleche bag a0408	
	NV5.E01.fp03	focus panel	Glass Beads		By 1870 the smaller seed beads were available. The Utes became expert bead workers decorating clothes, moccasins, horse blankets, cradleboards with intricate designs Beaded blanket strips were sewn to wool and hide blankets that were worn over the shoulder. The high back cradleboard was unique and often highly decorated with intricate bead patterns. Small beaded bags and pouches were popular to carry small items, ration tickets or in some cases strike a light. Larger bags like dance bags would attach to the waist and carry special items such as tobacco or sage. People carried their pipes in tanned hide bags embellished with beads.	Moccasins a0426, Bags and Pouches a0434- a0438, a0440-a0442, a0444-a0453, Awl case a0460, Pipe Bag a0420, Belts a0430, a0431, Blanket strips a0428, Cradleboard a0416, a0417.	
	NV5.E01.ar-	artifact label	objects related to the use of beads that the Ute traded for.				
	NV5.E01.fp04	focus panel	objects related to childrearing/passing on traditional knowledge		Before Europeans arrived Ute children learned from their parents and grandparents. Tradition was past from generation to generation so the stories, survival skills, and knowledge of the natural world would be past on. Ute people felt they were the stewards of the land and not the owners.	Child's moccasins a0424; a0427; Doll moccasins a0425, Doll Cradle a0418; Umbilical Fetish Bag a0439, Child's dress a0455, Turtle amulets a2764, a2765, a2766	
	NV5.E01.ar10	extended artifact label	Settled life		As Settlers, explorers, miners and traders moved in they wanted the Ute people to become herders and farmers. The Ute people believed if they stayed in one place they would starve. Despite these uneasy alliances, Ute people stood behind America's symbols and have continued to fight in American wars.	Am. Flag headband a0429; Am. Flag watch fob a0458	

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	NV5.E01.sp01	story panel	story that relates to the Bear Dance--we may want to focus on White Mesa (Ute Mountain) Bear Dance, also--we have a great photo by Steve Trimble identified OR, we can send Kenny to the spring Bear dance at Northern Ute.			Moccasins a0421, Hat bands a0432, Arm bands a0463, Arm Bands a0457, Hand game a0457, Vest a2769, Medallion a2775, Bag a0433	
	NV5.E01.fp05	focus panel	Contemporary crafts by Fabian Jenks	Traditional arts are still important today.	Contemporary crafts today follow traditions but incorporate innovation and inspiration from may sources. Artists' work is highly valued by both Indians and non-Indians. Beaded and leather pieces continue to be produced for powwows and celebrations that renew traditions, stories and culture.	a0419; a0443; a2767; ao454; a2768	
NV5.E01.tt01		activity table	Interactive table with touch objects and images related to contemporary Ute artist.				
	NV5.E01.ar01	touch object	An array of flutes made by Nino Reyes		Nino Reyes		
	NV5.E01.sx01	special exhibit- raw materials	raw materials used to make flutes- reed and tools				
	NV5.E01.ar02-04	artifact label					
	NV5.E01.sp02	story panel	Text introduces visitors to Nino Reyes and the story and tradition of his craft				
	NV5.E01.gi01-gi04	graphic images	Images reflect the process of making the object- from raw materials to detailed handiwork-				
	NV5.E01.gc01-gc04	graphic captions					
NV5.E02 NW Band Shoshone So-so-goi							
NV5.E02.ca03		case					
	NV4.E01.ar-	artifact labels	case highlight object	Shoshone-bustle		Shoshone-bustle a1257 show center only	

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	NV5.E02.ms01	mindset	Shoshone		The Northwestern Band of Shoshone is of seven original bands of Shoshone people. Unlike many of their relations they didn't acquire horses, and thus were known as So-so-goi, those who travel by foot. The historical moment that continues to define the tribal consciousness of the Northwestern Band is the Bear River Massacre. With the deaths of over 300 tribal members and loss of their Bear River Valley, the Northwestern Band faced a new way of life with the oversight of their Mormon neighbors and the successors to their land. The Northwestern Band now includes 456 enrolled members, many of whom are active members of the Mormon Church. As Patti Timbimboo Madsen, Cultural Resources Manager for the tribe relates, “The people who became the Northwestern Band of Shoshone had to adapt to change or die.”	Floral moccasins a0343; Blue moccasins a0350; Children's moccasins a0348; Water bottle a3130, Basket a3131	
	NV4.E01.ar-	artifact labels					
	NV5.E02.sp01	story panel			It is a new generation's responsibility to pass along history and traditions just as the ancestors did. Artist Rios Pacheco creates one-of-a-kind clothing for powwow dancing that is rich with historical meaning. As a teacher and purveyor of beadworking and traditional arts, he keeps stories and long-established techniques in play. Each component of this ensemble combines to tell the story of the Northwestern Band. (In notes, states that this story will be recorded by Kathy Kankainen)	Rios Pacheco Dance Regalia a1248-1261	
	NV5.E02.fp01	focus panel				Woven water bottle a0368; Winnowing tray a0365	
	NV5.E02.fp02	focus panel			In 1875, the first permanent home for the Northwestern Band was located near Corinne, Utah. The people were forced to give up a nomadic lifestyle and replace it with farming. The Shoshone were ultimately expelled by the military from this settlement. Some moved to Fort Hall in Idaho, while others returned to their traditional homeland in Cache Valley.	Tassel moccasins a0349; Beaded bag a0361; Beaded bag a2238; Beaded bag a2239; Beaded bag a2241; Fort Hall Bag/Pouch a0359; Fort Hall Bag/Pouch a0360; Beaded bag a2240	
	NV5.E02.fp03	focus panel			In 1863, following the Bear River Massacre, the Treaty of Box Elder was signed to agree that “friendly and amicable relations be re-established” and that “a firm and perpetual peace shall be henceforth maintained between the said bands and the United States.” After the signing of the Box Elder agreement, government officials attempted to get all of the Northwestern Shoshone to move to the newly founded Fort Hall Indian Reservation in Idaho. After several years of receiving their government annuities at Corinne, Utah, near the mouth of the Bear River, some Shoshone Indians bands finally gave up their homelands in Utah and settled at Fort Hall, where their descendants live today.	Beaded Eagle belt buckle a0371; Band a2330; Leg bands a2232; Arm bands a2237; Purse a2236; Cradle a0341; Shoshone Bannock moccasins a0346; Blue/Rust moccasins a0352; Blue moccasins a0353; Loom beaded necklace a2247	
	NV5.E02.gi01	graphic image	Image of Bear River Massacre gravesite				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	NV5.E02.gc01	graphic caption					
	NV5.E02.gi02	graphic image	Powwow dancers in regalia				
	NV5.E02.gc02	graphic caption					
	NV5.E02.ar01	artifact labels	Storytelling, dance, and handgames offer social events at which this sharing occurs.			Handgame sticks a2255; Beaded bag a2234; Beaded bag a2235; Blanket strip	
	NV5.E02.gi03	graphic image	A handgame gathering, acquired from NW Band of Shoshone Tribe.				
	NV5.E02.gc03	graphic caption					
	NV5.E02.ar02	artifact label			Educational programs bring families and children together to rediscover and reclaim traditional activities and stories.	Cradle a0391; Cradle a0338; Cradle a0340; Coyote Steals Fire: A Shoshone Tale (Children's story book) a2250; Children's moccasins a0347; Children's moccasins a0345	
	NV.E02.gi04	graphic image					
	NV5.E02.gc04	graphic caption					
	NV5.E02.gi05	graphic image	Photograph of Bear River, new photos by Kenny for this.				
	NV5.E02.gc05	graphic caption					
	NV.E02.gi06	graphic image	Photograph of Fort Hall Powwow, source to be identified				
	NV5.E02.gc06	graphic caption					
NV5.E02.tt01		activity table	Interactive table				
	NV5.E02.ar01	touch object	hair pipe choker				
	NV5.E02.sx01-sx03	special exhibit- raw materials	leather cord, shell, hair pipes for touching	materials will be connected to process graphics			
	NV5.E02.ar02-5	artifact label					
	NV5.E02.sp01	story panel	Text introduces visitors to Rios Pacheco, his work, and how he learned the traditional craft		There are a number of Northwestern Shoshone artists, like Rios Pacheco, who are known for their beautifully crafted beadwork from jewelry to dance regalia. In beadwork classes, artists learn the craft and learn more about language, genealogy, stories and oral history of their people.		
	NV5.E02.gi07-gi10	graphic image	Images reflect the process of making the object- from raw materials to detailed handiwork-				
	NV5.E02.gi11	graphic image	photos of Rios Pacheco at work				
	NV5.E02.gc07-gc11	graphic captions					
NV5.E03 Goshute- Newe			Goshute: Skull Valley Band and Confederated Tribes of Goshute at Ibapah				
NV3.E03.ca04		case					
	NV4.E01.ar01	artifact labels	case highlight object	Goshute-seed jar		Goshute-seed jar a3129	

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	NV5.E03.ms01	mindset		For Goshutes today, education of their children and preservation of their language remain top priorities. (reference boy's and girl's cradles in association with this message)	There are two Goshute Tribes residing in Utah on reserved land: the Confederated Tribes of Goshute (409 members) whose land is located on the Utah/Nevada border and the Skull Valley Band of Goshute (127 members) whose reservation is located in Skull Valley Utah. Many Goshutes today have family ties within both tribes and more broadly among their Shoshonean relations. From UMNH exhibit text: We are the remnants of small nomadic bands of Shoshonean-speaking peoples of Western Utah and Nevada. The white man has called our homeland a desolate, empty, and barren desert. We knew it as a sea of sagebrush with mountain islands that provided us with plants, animals and water. We followed the seasons gathering seeds, berries, roots, and insects. We lived in small family groups that came together for communal rabbit drives, antelope hunts, ceremonies and socializing. When our springs, creeks and valleys were taken by settlers, we starved. We were reduced to begging and raiding settlements. Years of conflict. Despite many attempts to relocate our people to other lands, we have remained in our homeland. Set aside by executive order in 1914, the Ibapah reservation- Aveenbah, meaning milky water- lies between the Deep Creek Mountains of Western Utah and Antelope Mountains of Eastern Nevada. Today, we are struggling for economic development, the education of our children, and the preservation of our language and culture.	cradle a0096; Cradle a0097; Cradle a0374; Doll cradle a0335; Purse a0101; Moccasins a2249; Water vessel with grass stopper a0093	
	NV5.E03.ar01	artifact label		Cradleboards created for girls and boys differ in design. Girls have a zig zag while boys have straight lines in the design and shade of the boards. Pouches and bags were sometimes used to carry smudgings.			
	NV5.E03.gi01		new Ibapah baby in cradle image by Kenny Blackbird				
	NV5.E03.gc01			Traditions still inform contemporary Goshute people and their lifeways.			
	NV5.E03.fp01	focus panel		Goshute food gathering and production is based on a desert lifestyle	Historically, the Confederated Tribes of Goshute knew their environment intimately and were masters of the seasonal round. They gathered plants for both food and medicinal purposes. While their home territory is among the most desolate in the broad expanses of the West Desert, their food gathering led them to fertile marshlands, the foothills and highlands of the Deep Creek Mountains, and the shores of the Great Salt Lake. This subsistence lifestyle was flexible and mobile and resulted in a wonderful array of basket types designed for gathering and storing food and water.	Chokecherry basket a0090; Water bottle a0092; Treasure basket a3129, Nesting basket a3128	

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	NV5.E03.gi02	graphic image	Historic photograph of Goshute women and baskets (UMNH collection)				
	NV5.E03.gc02	graphic caption					
	NV5.E03.gi03	graphic image	Photograph of plants/plant expert at Ibapah (Kenny Blackbird to photograph)				
	NV5.E03.gc03	graphic caption					
	NV5.E03.fp02	artifact label	In 1995, Ethnobotanists Elaine York and Paul Cox visited with members of the Goshute Tribe and with their guidance, documented important specimens at the Reservation.	Pine nuts are very important to the Goshute historically and today.	The taste and smell of pine nut mush is especially nostalgic, and tribal members gather the seeds of the pinon in good seasons. The harvest is good every three years and the best place to collect is where there has been rain. The nuts are cooked and then shelled using a rock. Pine nut dances are done before the harvest.	Winnowing basket a0095; Pinenut bowl a0088, Plant vouchers- tbd	
	NV5.E03.gi04	graphic image	Photograph of pine nut winnowing from Baskets of the Great Basin w/ permission.				
	NV5.E03.gc04	graphic caption					
	NV5.E03.ar03	artifact label	relationships between farmers and ranchers		Surrounded by farmers and ranchers who took up residence around Goshute lands, Goshute artisans at Ibapah and Skull Valley created sturdy work gloves embellished with beadwork for the home market and to sell to their neighbors. The most ornate gloves were usually made to sell.	Gauntlet gloves a0102 or a0104	
	NV5.E03.fp03	Focus panel	making a living	Today the Goshute are faced with the difficulty of finding sustainable economic development.	The Skull Valley reservation is approximately 18,000 acres surrounded by waste repositories, the Deseret Chemical Depot, Dugway Proving Grounds, and a bombing range. For more than ten years the community at Skull Valley has been deeply divided over the prospect of a nuclear waste repository on their tribal lands. While some of the tribe stood behind the initiative to collaborate with Private Fuel Storage to bring high level nuclear waste to Utah--in order to bring jobs, education and training, housing and improved infrastructure for the future—other members of the tribe have fought long and hard to halt these plans. Whether or not a nuclear waste site would have been a sustainable choice, the process was an important reminder of the sovereign status of Indian tribes. With only about 30 tribal members living at Skull Valley, it is clear that most tribal members must make a living elsewhere. Laine Thom lives far from Skull Valley, but has taken along his extraordinary beadworking skills--learned from his mother and grandmother and influenced by all his relati	Laine Thom beaded dance bag a0103; Floral Bag/Pouch a0356; Quilled moccasins a0354, a0357, Dolls a0099, a0100	
	NV5.E03.gi05	graphic image	Photographs of Margene Bullcreek and Leon Bear at Skull Valley signpost (existing source--will seek permission)				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	NV5.E03.gc05	graphic caption					
	NV5.E03.ar05-ar12	artifact label	influences of other groups on Goshute artists Laine Thom and Shoshone Linda Harrelson		There have always been relationships among the many tribes and bands of Shoshone people of the Intermountain West through collaborative hunting, social gatherings, and intertribal marriages. Such visits brought opportunities for trade, gift giving, and the exchange of ideas and technologies.	Moccasins with beaded soles a0344; Beaded knife sheath a0342; Beaded doll a0337; Geometric Bag/Pouch a0355; Floral with handle Bag/Pouch a0358; Doll Cradle a2248; Beaded choker a0372, Quilled moccasins a0354, Beaded bag with flower a0356, Beaded dance bag a0103, Beaded bag a0357	
	NV5.E03.sp05	story panel			In 2007, a pilot program to bring solar energy to Skull Valley was organized with an eye to alternative solutions to the economic progress needed in this remote community.		
	NV5.E03.gi06	graphic image	Photos and words from "People of the Dust"				www.youtube.com/watch?v=3IjbPkr5VzI
NV5.E03.tt01		activity table	Interactive table with touch objects			Laine Thom doll a0098	
	NV5.E03.ar01	touch object	A beaded bag made by artist Laine Thom				
	NV5.E03.sx01	special exhibit- raw materials	trade cloth, beads, and examples of other influences				
	NV5.E03.ar03-ar05	artifact label					
	NV5.E03.sp06	story panel	Text introduces visitors to Laine Thom the story and process of his craft and the history and tradition of beadwork	The beadwork of the Thom family has been inspired by different Native styles and traditions over the years.	Laine Thom comes from a family known for generations for their exquisite beadwork. His mother, Ardis Brown, his grandmother Vida Bear, and his great-grandmother; Daisy Baker, were well respected-artists whose work was appreciated by both community members and art collectors. Thom is well known for his fine beading and also for his documentation of beadwork styles, techniques, and traditions in the Rocky Mountains. (UMNH text)		
	NV5.E03.gi05-gi08	graphic image	Images reflect the process of making the object- from raw materials to detailed handiwork-		Laine Thom uses many different designs to develop the unique patterns and shading that characterize his work.		
	NV5.E03.gi09	graphic image	photos of Laine Thom and his family				
	NV5.E03.gc05-gc09	graphic captions					
NV5.E04 Nuwuvi Southern Paiute "The People"			Title Panel				
NV5.E04.ca05		case					
	NV4.E01.ar	artifact labels	case highlight object	Paiute-basketry hat		Paiute basketry hat- a0918	
	NV5.E04.ar	artifact label	Object label: Powwow provides the Paiute Indian Tribe of Utah with a rich way to celebrate life and heritage and the restoration of the federal trust relationship with the five Bands.				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	NV5.E04.ms01	mindset		The Paiute Indian Tribe of Utah, which was created by an act of Congress in 1980 is actually a confederation of five Paiute Bands that were independent for generations. The Paiute tribe was terminated in 1954 by the federal government and reinstated in 1980. Today, the constituent bands that make up the PITU are the Shivwits Band, Indian Peaks Band, Kanosh Band, Koosharem Band, and Cedar Band.	Southern Paiute territory once stretched from Death Valley to Monument Valley and included the five bands now recognized as the PITU as well as the Kiabab, Moapa, Las Vegas, and San Juan Paiutes. Each of these communities knew the land and it plants and other resources making it possible to live in the varied and arid lands that were their expansive land base. Small mobile communities of 100-150 individuals was traditionally the norm, and today, while the five bands of PITU collaborate in many ways, each band retains autonomy and communities remain small. Traditional lands of the Southern Paiute Nation stretched from Death Valley to Monument Valley. As skilled botanists who knew the land, its plants, and its resources, we were known for our ability to survive in harsh climates. We lived in family communities, as we do today. The Paiute Nation includes the Paiute Nation of Utah, Kaibab Paiutes, Moapa Paiutes, Las Vegas Paiutes, San Juan Paiutes, and the Chemehuevi. Now, Paiute tribal populations are small, with 100-900 members. Our language is part of the Numic language family which includes Gread Basi tribes and Comanche. History has not always been kind to the southern Paiute. Encroachment of Euro-American settlers into the area brought destruction of our culture, health, religion, economy and title to our homelands. Despite ill-conceived attempts to "help the Indian tribes," we still remain close to our ancestral lands. We have survived acculturation, relocation, and termination and we retain our distinct identity as a tribe. (UMNH exhibit text)	Beaded Dance Bag a0926, Matching moccasins and gloves (Shivwitz) a2368, a2369, a2370, a2371, Large beaded bag a0926	
	NV5.E04.fp01	focus panel	Basket making skills passed from generation to generation	Unique Southern Paiute basket-making skills were passed down from generation to generation for centuries.	The Southern Paiute developed a broad range of basketry types directly related to food gathering, preparation and storage to accommodate a wide range of wild foods collected. Twined seed beaters freed seeds from their stalks and conical burden baskets carried heavy loads. Winnowing trays, with seeds tossed skyward, separated hulls from seeds and nuts, and precious seeds were kept from year to year in tightly twined containers. They included both coiling and twining techniques.	Baskets a0907, Gathering baskets 0914, Twined seed baskets- a0929, a0913, Twined storage baskets a0931, Coiled bowl a0933, Seed beater a0913, Winnowing trays- a0934, a0935, a0910, a0915, Seed bottles a0911, a0912, Coiled trays- a0927, Shivwitz bowl a0916	
	NV5.E04.gi01	graphic image	Photograph of Kiabab Basket Maker, 1870s				
	NV5.E04.gc01	graphic caption					
	NV5.E04.gi02	graphic image	Photograph of Cedar Band Paiute woman splitting willow, 1936 Contemporary Shivwits community (Kenny Blackbird photo)				
	NV5.E04.gc02	graphic captions					

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	NV5.E04.ar-	artifact label			Both Southern Paiutes and their relations in the high deserts of Western Nevada and Oregon created twined basketry hats to protect themselves from the desert sun and made pitched vessels to carry and store water.	Water bottles- a0930, a0909, Shivwitz water bottle a0917, Twined water bottle a0932	
	NV5.E04.gi03	graphic image	Photograph of Kiabab women wearing hats, 1870s				
	NV5.E04.gc03	graphic captions					
	NV5.E04.ar-	artifact label			Finely coiled basketry trays have a long tradition among the San Juan Southern Paiute adding beauty and function to their daily lives and providing goods for trade and sale. Into the 1980s a small cadre of San Juan Southern Paiute weavers began creating remarkably fine baskets with complicated and colorful designs to serve the global collecting market.	San Juan Southern Paiute basketry trays a0908	
	NV5.E04.gi04	graphic image	Photograph of San Juan Paiute Basketmaker, 1936				
	NV5.E04.gc04	graphic caption					
	NV5.E04.ar-	artifact label	Eleanor Tom, Cedar Band		Earnestine Lehi, Indian Peaks Band, learned to make cradles from her mother using willow for the frame and sunshade, sinew to bind them, and buckskin for the cover. In 2000, members of all five bands of the Paiute Tribe of Utah gathered to share information and learn from her. One of her students, Eleanor Tom, of the Cedar Band, has gone on to teach others in her community.	Paiute Cradles- a0920, a0936 Paiute Doll Cradle a0921, Doll and cradle a1023	
	NV5.E04.gi05	graphic image	Eleanor Tom, 2001, in hand				
	NV5.E04.gc05	graphic caption					
	NV5.E04.fp02	focus panel			Depending on the season, Paiute clothing was traditionally made of woven buck brush (the inner bark of the cliff rose), beautifully tanned hides, or rabbit skins cut into strips and twined into warm robes. Each type of clothing required local resources for materials and a wide range of skills for production. Paiute beadwork incorporates designs that resemble arrows, arrowheads, and floral patterns. Northern Paiutes add beadwork to basket forms and bottles as well as to clothing and regalia.	Beaded moccasins- a0924, Baby moccasins a2252, beaded water bottle- a0922, beaded baskets a2253, a2254, Barkskirt being made a3127	
	NV5.E04.gi05	graphic image	Review Kenny's photos for appropriate image				
	NV5.E04.gc06	graphic caption					
	NV5.E04.fl01	family label	Bring attention to beaded water bottle in exhibit	Waterbottles, both plain and fancy, are important for people who live in arid country. Do you carry a water bottle? What does it look like?			
NV5.E04.tt01		activity table	Interactive table with small size cradleboard				
	NV5.E04.ar01	touch object	An object made by Eleanor Tom				
	NV5.E04.sx01-sx05	special exhibit- raw materials	samples of whole, peeled, and split willow; cloth, canvas, colored yarn				
	NV5.E04.ar02-ar05	artifact labels					

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	NV5.E04.sp01	story panel	Text introduces visitors to Eleanor Tom and the story and process of her craft		traditions of cradleboards and traditional ways of crafting distinct cradleboards for boys and girls.		
	NV5.E04.gi01-gi03	graphic image	Images reflect the process of making the object- from raw materials to detailed handiwork-				
	NV5.E04.gi04	graphic image	photos of Eleanor Tom and colleagues at work on cradle project.				
	NV5.E04.gc01-gc04	graphic captions					
NV5.E05 Navajo							
NV5.E05.ca06		case					
	NV4.E01.ar02	artifact labels	case highlight object	Navajo-pitched water carrier		Navajo-water carrier a0153	
	NV5.E05.ms01	mindset	Clans and language define the Navajo people	The story and history of the Navajo nation is one of tenacity, adaptability and endurance.	The Navajo or Dine' have a long-standing oral tradition rooted in the clan system, Navajo language, the land, and core beliefs to pass on traditional knowledge from generation to generation. Changing Woman is the daughter of Mother Earth and Father Sky and the spiritual mother of all Navajos. She gave birth to twins Monster Slayer and Born of Water. They killed all the monsters on earth. When it was safe, Changing Woman and her husband the Sun traveled to earth and Changing Woman created the four original clans of humans. The Navajo homeland sits within four sacred mountains, which are Mt. Blanca to the East, Mt. Taylor to the South, San Francisco Peaks o the West and Mt. Hesperus to the North. Present Navajo land is in New Mexico, Arizona and Utah. When the Spanish first entered this land in the 1600s they brought horses, goats and sheep. Neighboring Pueblo people learned to shear, scared, spin and dye wool and to weave, and the Navajos likely learned weaving from them However, oral history and tradition teaches that Spider Woman taught the Navajo how to weave. Navajos also acquired horses and sheep at this time, which remain important today. The Spanish sheep are Churro--well-suited to life in the desert. The long straight wool contains little grease and can be spun and woven without being washed. Weaving brought a new dress style to the Navajo, the biil: two rectangular pieces joined at the shoulders. Navajos used natural dyes and Indigo blue that was brought up from Mexico. The most prized thread was from Spanish cloth or bayeta which the Navajo unraveled and respun for their weavings.		A photo of Monument Valley w/Navajo Mt. in the back is a fitting photo here.
	NV5.E05.fp01	focus panel	The Navajo people's successful adaptation to other cultures over time has enabled them to survive and thrive.	Navajo culture tells a story of their encounters and adaptations with neighboring cultures like the Pueblo Indians and white homesteaders.		Child's wearing blanket a0173, Navajo dress a2304 and sash a3126 (shown together) Weaver and loom a0163, wedge weave sample a 0162	
	NV5.E05.ar-						

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	NV5.E05.fp02	focus panel	Objects made for kids	Navajo adore and dote on their children.	Navajo adore and dote on their children. After a child is born wood is chosen from a juniper or cedar tree. A gift of the Holy People, he two back boards for the cradleboard represent mother earth and father sky. A wide piece of cedar is bent at the head representing the rainbow and providing shade and safety for the baby. Traditionally, the umbilical cord is buried near the home, to connect the baby to home and mother earth.	cradleboards a0149, a0151, blanket a0196, baby moccasins a0161, a2367	
	NV5.E05.gi01	graphic image	We have many contemporary and historic photos of Navajo kids				
	NV5.E05.gc01	graphic caption					
	NV5.E05.ar-	artifact labels	Silver work	Since the advent of silverwork in Navajo country, this art form has become	Before the Long Walk a Navajo Medicine man named Old Smith had a Mexican friend who taught him to make iron ornaments for bridles. When Old Smith returned from Ft. Sumner he went back to his Mexican friend to learn how to forge and hammer silver. Old Smith also taught his four sons. Several great turquoise mines produced beautiful stones. Jewelry making has flourished with many great and highly skilled artists	Necklace a0183, Bracelet a0184, Coral necklace a0180, Squash Blossom Necklace a0179, Silver Bead necklace a0190, Silver and Turquoise cross necklace a0192, Silver cross necklace a0193, a0194, Silver bracelets a0186, a0187, a0188, Silver bridle a0176, Canteen a0177, Ketoh a0178	
	NV5.E05 gi02	graphic image	Photograph of Navajo silversmith (in hand)				
	NV5.E05.gc02						
	NV5.E05.sp01	story panel	story that relates to The Long Walk	This can be drawn from the recently produced film about the Long Walk by KUED.	The incarceration of thousands of Navajos from 1863 to 1868 at Ft. Sumner (the Long Walk) was devastating for Navajos. It is still a profound and a sad event that affects Navajos today. The Treaty of 1868 promised Navajos the provisions to help begin again. These were hard years of reconstruction. It took 15 months for sheep to arrive. Women wove coarse saddle blankets with no pattern to sell fast. Later the quality of saddle blankets would improve dramatically incorporating twill patterns.	Saddle blanket a2310, Mocca	historic photos available.
	NV5.E05 gi03	graphic image	photograph of Navajo women in tiered and velvet skirts reflecting outside influences.				
	NV5.E05.gc03			New clothing style adopted at Bosque Redondo (Fort Sumner	Velveteen shirts, worn by Navajo men for special occasions, emerged during the late 1800s. At this time, women also began to wear cut-and-sewn blouses of cotton, and later velveteen, influenced by the four-year incarceration at Fort Sumner, an influx of traders into the region, and bitter experience as slaves in New Mexico. As today, men's shirts, often embellished with silver buttons and other accoutrements, were worn with trousers. Women's blouses continue to be paired with long tiered cotton or velveteen skirts.		

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	NV5.E05.fp03	focus panel	objects reflecting the end of some traditional ways	While Navajos are known for many traditional and contemporary arts that enjoy international renown, some of their material culture ended with the changes brought on by western expansion.	When the railroad came in 1881 it brought an end to handmade equipment. Navajos previously wove baskets for storage, gathering and cooking. The Navajo cooking pot and pitched water bottle were staples in the desert. In the 1700s Navajos were creating pottery with black or black and red designs on buff. For cooking they made bullet-bottom pots sometimes with a fillet decoration on the rim. Now they had access to metal pots and pans and other containers. Traders also appeared and set up trading posts throughout the reservation trading wool, rugs and jewelry with the Navajos for food and other necessities.	pitched water bottles a0152 a0154, Cooking pots a0155, a0157, a2309, Pictorial rug of Navajo life a2305, Dolls a 2303, a0171, a0165	
	NV5.E05.ar	artifact label	prominent objects related to traditional Navajo past and lifeways				
	NV5.E05.ar		Classic Navajo rugs		With the advent of traders came the demand for handwoven rugs to be sold to people in the east. Commercial yarn was also available in many colors. Traders had their weavers follow patterns that were often more oriental and very fine with complicated geometric designs. Rugs are named more for the region they came from. Pictorial rugs, yei, storm pattern and sand painting rugs do have some interpretation.	Tree of life rugs a0170 a2306, Two gray hills rug a0174, Storm pattern rug a2312, Wide ruins rug a0175	
	NV5.E05.gi04	graphic image	image of Navajo family seated in front of a huge loom, early 1900s. (UMNH collection)				
	NV5.E05.gc04	graphic caption					
	NV5.E05.fp04	focus panel	Contemporary baskets/emergent artform	Early traditional basket forms had a rebirth in the late 20th century.	Ceremonial basket weaving nearly died out as there were so many restrictions and taboos for women who wove them. For ceremonial use Navajos often bought these baskets from the Utes and Paiutes. The baskets used in ceremonies are given to the medicine man. When there is illness or disorder specific ceremonies, prayers and songs are used to heal. Baskets have seen a revival in the late 20th century with many original and varied designs being produced including story baskets that relate stories and traditions in the Navajo culture. The process for basket weaving remains the same as does the process and set up for loom weaving which has also seen innovation from weavers who create from their own view of Navajo myth and tradition. Navajos believe they must have harmony and balance or hozho in their art as well as in their every day life.	Traditional basket a2308 Beacon baskets (set of three) a2301, Horse story basket a2307	
	NV5.E05.ar-	artifact labels	Ceremonial basket weaving nearly died out as there were many restrictions and taboos for women who wove them. For ceremonial use Navajos often bought these baskets from the Utes and Paiutes.				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	NV5.E05.fp05	focus panel	sacred art	Sand paintings are created with colored sand during sacred ceremonies in hogans and then erased. Imagery found in sand paintings depicting yeis are found in rugs, paintings, baskets and framed sand paintings.	Traditional Navajo beliefs do not separate religion from daily life. The relationship of all living things and the land must stay in balance, which requires prayer at specific locations and at ceremonies. Ceremonies are performed in hogans--the traditional six-sided family dwelling. Most ceremonies are for healing illness or disorders and are performed by a medicine man using ceremonial baskets. sandpaintings, local herbs and minerals. The sandpaintings are elaborate and intricate and are made directly on the hogan's dirt floor. After the ceremony, the painting is erased. While some of the figures--yei bi chais produced in sandpaintings--have been reproduced in framed sandpaintings, baskets, and rugs which are made for a thriving art market.	yei bi chai dolls (8) a0169, yei rug a3120, Sandpainting rug a 0172, Framed sandpainting a0148, Marilyn Scott rug a3121	
	NV5.E05.ar	artifact label	Sand paintings were originally done with colored sand during sacred ceremonies in hogans and then erased. Today these sand painting designs depicting yeis are found in rugs, paintings, baskets and framed sand paintings.				
NV5.E04.tt01		activity table	Interactive table with basket and images related to contemporary Navajo artist				
	NV5.E05.ar01	touch object	A basket start related to those made by Joanne Johnson can be touched. Original baskets are in case				
	NV5.E05.sx01	special exhibit- raw materials	natural dyes, sumac	natural materials are used and combined with computer generated images to create contemporary patterns			
	NV5.E05.ar02-						
	NV5.E05.sp02	story panel	Text introduces visitors to Joanne Johnson, a working basketmaker who describes the history and tradition of the craft.				
	NV5.E05.gi01	graphic images	Images reflect the process of making the object- from raw materials to detailed handiwork-				
	NV5.E05.gc01						
	NV5.E05.gc04						
NV5.E06.av01		av	av production contains firsthand accounts, historic images, and interviews addressing the themes of the outer circle exhibits.	General Memory is preserved by those who tell, listen and repeat the stories of their lives.			

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
NV6 Center- Storytelling Circle			This area is a recessed storytelling area surrounded by tiered seating and large vertical scrims displaying contemporary imagery. Here, visitors listen to an audio program featuring stories of origin and connections to the land.				
NV6.E01.av01-av04		av	An audio loop of stories related to each of the Utah's tribe in native languages cycles through. An English translation is visible on monitors in the storytelling circle.		Storytellers may include: Helen Timbimboo (Shoshone) Maude Moon (Goshute, deceased), etc. from the collections of the University of Utah.		
	NV6.E01.ap01-ap04	activity prompt	activity prompts associated with each caption reader		encourages visitors to listen to the stories		
NV6.E01.tt01		table top					
	NV6.E01.ms01	mindset	Stories will need to be carefully screened so that they are appropriate to play in the current season. Most traditional stories can only be told in winter. We need to honor this.	Stories sustain people and traditions and provide entertainment.	The history of Native people begins with stories and their stories of origin, often called creation stories. These stories are part of an oral tradition that predates European contact and extends back for countless generations. Creation and origin stories tell of how the world was made and how groups of people came into being. They explain how animals, humans, and the natural world were created, and offer instructions and lessons for living. Many of these stories are humorous and are traditionally told in the winter season when people spend time indoors and are looking to be entertained. Among many groups in the West, powerful trickster characters, such as Coyote and Raven, have mystical powers that helped create and order the universe. These tricksters teach lessons through their own mistakes and sometimes take on human characteristics to show how greed or deceit can be dangerous.		
	NV6.E01.gp01-05	photo mural	5 scrims with photomurals of storytellers in action- both contemporary and historic. These should represent the five groups of Utah.				
	NV6.E01.gc01-05	graphic captions					
	NV6.E01.fl01	family label		Storytelling is an activity for all ages, and is a way that Native Americans have kept their culture and traditions going for so long.	What stories does your family tell? When are they told?		

OUR BACKYARD

You can be a naturalist in your own backyard. There is more than one habitat in your backyard.

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
OB1 Introduction	OB1.E01.ip01	intro panel (title)	Introduces observatory title- outside room				
OB1 House Area			The house provides habitats for animals and plants. The nearness of the house makes the porch a place of year-round warmth and protection that can't be found anywhere else in the backyard.				
OB1.E01 Front Porch			Visitors encounter the porch area after they have parked their strollers, and from there, are introduced to an environment that links them to nature through inside and outside exploration and inquiry. Hooks hold picnic baskets containing magnifiers, binoculars, clipboards, and laminated cards to guide observation and point visitor's attention to aspects of the space.				
	OB1.E01.sx01	interactive	Kids lift up plant pots to reveal a 3-D model of a bug underneath				
	OB1.E01.sx02	interactive	Kids lift up plant pots to reveal a 3-D model of the plant's roots beneath				
	OB1.E01.gp01	graphic panel	The graphic panel shows a swallows nest and modeled swallow peeking out.	The porch offers a perfect place for wasps, hornets and swallows to build their nests.			
	OB1.E01.ap01	activity prompt	Activity prompt encourages families to take a basket and explore the different areas of the space.				
	OB1.E01.sx02	special exhibit	Woodpile with embedded terrarium holding a black widow				
OB1.E02 Kitchen Area			Microscopes, measuring tools and magnifiers to explore specimens are in the unlocked cupboards for exploration on the counter or at the kitchen table. Samples might include things related to backyard habitats- owl pellets, slug trails, cocoons, eggshells, animal hair, leaves, nuts and other natural materials. Unfixed jars (provided by owners) filled with peaches, buttons and other objects can be stored in upper cabinets for facilitated use and exploration.				
	OB1.E02.gp01	graphic panel	provides Id's for specimens				
	OB1.E02.gp02	graphic panel	A spider and the webbed creations they make are on a graphic panel in the corner of the kitchen.				spider webs to examine
	OB1.E02.qt01	quote	Quote addresses the hidden discoveries that kids might find indoors				
	OB1.E02.sx01	special exhibit (along back wall)	Live insect zoo- insects in jars- eight fixed jars			Tarantula, Wolf spider, Jumping Spider, Centipede, Jerusalem Cricket, beetle, desert hairy scorpion, Praying mantis	
	OB1.E02.sx02	special exhibit					
	OB1.E04.ar01-ar11	artifact labels	Labels identify insects and a fun fact about them such as where they live, what they eat and where you might find one crawling or flying.				
OB1.E03 Garden			The garden adjacent to the house is a shallow “planted” area outlined by a raised curb. Here visitors can “water” the garden, “plant” seeds, and “uproot” vegetables growing. Graphic panels differentiate kinds of plants and the roots they grow as well as plants native to the area and seasonality.				
	OB1.E03.sx01-sx03	special exhibit	Models of typical garden plants in a planter box				
	OB1.E03.gp01-gp04	graphic panels	Graphic panels identifying plants and showing plant, root and seed identifiers				
	OB1.E03.gp05	graphic panel	Graphic backdrop showing four seasons				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
OB1.E04 Garden Center			Toolboxes with garden tools are provided for visitors to explore the garden.				
	OB1.E04.gi01	graphic image	Photomural contains the following interactions: pill bugs and millipedes break down organic matter in soil and centipedes and spiders eat smaller soil invertebrates. Harvestmen (daddy long legs) hide on old pots and on rocks. Earthworms aerate garden soil and mice eat roots, seeds and seedlings. Mantids hide on flower stems waiting to catch grasshoppers who are laying eggs in the soil and eating leaves and stems. Birds are attracted by the insects and seeds and bees gather pollen. Wasps and hornets make nests out of "paper" and mud on any available surface. Black widows make a messy web in old flower pots.				
	OB1.E04.qt01	quote	Quote describes the mysteries waiting to be discovered outdoors				
OB2 Tree Area			The tree area is a habitat comprised of many smaller habitats and highlights the living things visitors might find inhabiting the trees in their backyard. Visitors interact with different parts of the canopy to experience seasonal changes, hear the sounds of animals making their homes, and discover the texture of bark and moss.				
	OB2.E01.av01	av	Ambient audio related to critters in the tree, identified spots where visitors can listed to isolated sounds and connect to animals living in the tree.				
	OB2.E01.gp01-gp05	graphic panels	graphics identify critters connected to ambient sound.				
	OB2.E01.sx01	special exhibit	Peep holes in each each tree reveal models of animals, textured paths to trace and animals homes. These will include: model of a tree core that can be pulled out with rings on it				
	OB2.E01.sx02	special exhibit	textured beetle pathways				
	OB2.E01.sx03	special exhibit	knothole with critter inside (tbd)				
	OB2.E01.sx04	special exhibit	3-D seeds and leaf shapes				
	OB2.E01.sx05	special exhibit	tree trunks have tree bark replica texture panels of five different trees native to Utah				
	OB2.E01.gc01	graphic captions	Pine panel is reddish overlapping small "scales"				
	OB2.E01.gc02	graphic captions	Oak panel is grey-brown deeply furrowed				
	OB2.E01.gc03	graphic captions	Aspen panel is smooth, knotty silver-green				
	OB2.E01.gc04	graphic captions	Willow panel is yellow-orange shaggy, rough				
	OB2.E01.gc05	graphic captions	Maple panel is brown shallow furrows				
OB3 Underground Crawl			Small crawl spaces give children tunnels to crawl through and a chance to meet life underground through embedded cases and texture panels. An opening on top enables kids to pop up and see their parents and friends outside.				
Underground							

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	OB3.E01.pm01		Photomural for the tree area includes: Birds nest in tree branches and eat tree fruit and seeds, owls and squirrels nest in cavities (knotholes and at the base), ladybugs and wasps gather and feed on aphids and caterpillars. Moths are camouflaged on bark during the day and leaf and stick bugs are hidden in their respective elements. Underground photomural includes: A mole pokes his nose and front feet out of his burrow. Worms chomp through the uppermost layers of dirt and decaying leaf litter creating a network of tunnels. Tree roots extend throughout the layers and large ground beetles hide in pockets beneath the surface. Mice and voles make nests underground lined with leaves. Micro-soil organisms are visible through exploded views. The lower layers are rocky and have fewer critters living there."				
	OB3.E01.sx01-sx03	special exhibit	snake	Faceted walls of the crawlspace are double-sided cases containing live displays			
	OB3.E01.sx02	special exhibit	collared lizard				
	OB3.E01.sx03	special exhibit	ant colony				
	OB3.E01.ar01-ar03	artifact label	Labels identify snake, collared lizard and ant colony				
OB4 Pond Shoreline			The water area is designed to suggest a pond shoreline containing animal and plant habitats that visitors might locally encounter. The water table offers visitors the opportunity to get their hands wet, see what life forms are living beneath the rocks and move rocks around to change the path of water. A storage bin is set into the pond's edge and hold magnifiers and tools.				
	OB4.E01.pm01	photomural	Scenic pond shoreline mural including a black-necked garter snake, a marsh wren, Blue darner dragonfly, muskrat and little brown bat				
	OB4.E01.sx01	special exhibit	Shoreline water table				
	OB4.E01.sx02	special exhibit	Animal terrariums- Woodhouse Toad,				
	OB4.E01.sx03	special exhibit	Boreal Chorus Frog				
	OB4.E01.sx04	special exhibit	Tiger Salamander				
	OB4.E01.gp02	graphic panel	Explanation of the woodhouse toad's pondside habitat and daily habits				
	OB4.E01.gp03	graphic panel	Explanation of the boreal chorus frog's habitat and daily habits				
	OB4.E01.gp04	graphic panel	Explanation of the tiger salamander's habitat and daily habits				
	OB4.E01.ap01	activity prompts	Activity prompts encourages kids to look closely, and encourages inquiry as to what lives in and near the water's edge.				
	OB4.E01.gp05-gp07	graphic panel	Graphics depict three critters that live in or partially in the water. The following insects and fish are visible "swimming" in the pond: Blue darner dragonfly nymph, Bonneville Cutthroat trout, and a giant water bug.				Graphics including dragonflies, birds, reptiles, mammals and amphibians

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	OB4.E01.gp08-gp12	graphic panel	Graphic panels show five pond shoreline dwelling animals who make their home by the pond for unique reasons. (critters TBD)				
	OB4.E01.gp13	graphic panel	Tracks in the mud also tell a story of what creatures have been passing through.				Tracks in the mud
	OB4.E01.sx01	special exhibit	Scenic area at end of the pond with models of frog and fish.				
	OB4.E01.ap02	activity prompts	Activity prompts draws attention to the mural backdrop and encourages kids to look closely at the animals and plants on the scenic end of the pond.				

PAST WORLDS

Just as today, ecosystems of the past included producers, consumers, and decomposers cycling energy from the sun. The processes remain the same, while the organisms change over time.
1. Evolution and extinction of species affect diversity through time.
2. Utah has an incredible fossil record.
3. Paleontology is a multidisciplinary approach to studying ancient organisms and ecosystems.

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
PW1							
PW1.E01 Introduction							
Intro Panel	PW1.E01.ip01	observatory intro/quote	Introduction on background mural for Lake Bonneville scene	You are about to travel back in time and see some of the plants and animals of Utah's past ecosystems.	Invitation to travel back in time first stop is 11,000 years ago, on the shores of Lake Bonneville. The Past Worlds Observatory is divided into 4 time slices, starting at 11,000 years ago and extending back to 150 million years ago, each exploring the ecology and energy flow within ancient ecosystems. These time slices represent important pieces of the geologic record found in Utah including the Pleistocene, Eocene, Late Cretaceous, and Late Jurassic. During these times, oceans covered parts of Utah then retreated multiple times, mountains formed but eroded, then formed again, and glaciers and volcanoes reshaped the landscape. A primary goal for this Observatory is to establish that ecosystems today are very similar to ecosystems in the past. All ecosystems contain a complex web of interactions and energy usage, starting with the sun and flowing through the remainder of the organisms. The players change and grow more diverse through time, but the roles that are played within the ecosystems never change, just grow more numerous.	Mounted skeletons of *Platygonus, Mammuthus* adult and baby, *Canis dirus, Arctodus simus, Megalonyx*	outline map of Lake Bonneville and GSL
LOWER LEVEL							
Intro Panel	PW1.E02.ip01	observatory intro/quote		Learning about Utah's past is imperative to predicting Utah's future. Utah has an incredible fossil record. Almost all time periods are represented, and new discoveries continue to add to our knowledge of Utah's past.	Utah has an amazing fossil record. It's both complete (almost all time periods represented) and full of amazing finds. Utah, along with the Burgess Shale in Canada and sites in China, is one of few places with Cambrian soft-bodied material, including newly-discovered jellyfish. You can find fossils all over the state, including ice age critters in Park City and Research Park. Utah has one of the best records of the age of dinosaurs, including Cleveland-Lloyd Quarry and Dinosaur National Monument which have been excavated since the mid-1800s to Grand Staircase Escalante National Monument, where perhaps a dozen new dinosaurs have been discovered over the last decade.	recreated rock wall w. embedded fossils	

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	PW1.E02.fp01	focus panel	Focus panel explains real vs. cast material	This exhibit features real fossils, and cast bones; is there a difference?	In this exhibition, you will see both real fossils and casts of fossils. Fossils are the remains of ancient life that have been preserved in rock. Casts are not "fakes," but replicas made directly from molds of the real bones. Why display casts if you have the real thing? For large skeletons like the dinosaurs upstairs, real fossil bone can be very heavy and awkward to mount. Also, museums often prefer to have the real fossils available for scientific study, which would be hard if the bones were on exhibit. This exhibition has several types of specimens (the first of their kind described), which are particularly valuable scientifically, and are very rarely on display.		
PW2.E03 Pleistocene Mammals Case			Visitors see a tall case holding Bonneville fauna fossils and learn about the diversity of that fauna, how to tell mammoths and mastodons apart, and about species recognition and sexual selection.				
	PW2.E03.ca01	case	Fossil specimens of mammoths, mastodon skulls and skeletons, Bison antiques skulls, camel skeleton, etc. Fossils of other Cenozoic mammals tbd. Skeletons and cast skulls of C. dirus, and S. fatalis.			Fossil specimens of mammoths, mastodon skulls and skeletons, Bison antiques skulls, camel skeleton, etc. Fossils of other Cenozoic mammals tbd. Smilodon and canis	
	PW2.E03.ct01	case title	Title and subhead	Just 11,000 years ago, North America teemed with many different mammals, including giant sloths, mammoths, mastodons and cave bears.	Pleistocene 1.8 million years ago to 11,000 years ago The Ice Ages		digsite image
	PW2.E03.ms01	mindset panel	Mindset panel describes Pleistocene mammals	There were many mammals in the Pleistocene; some are familiar to us, others less so.	There were lots of herbivores during the Pleistocene. The types of herbivores present depends on the climate, which was much cooler than today. For so many types of herbivores to be present, there must have been lush vegetation, and many different kinds. There are differences in the way that many of these herbivores ate (grazing, browsing, both) and the types of plants they ate. There were many meat eaters, as well, including large saber-toothed cats, dire wolves, and bears that ate plants and meat.		dig site photos, scene with animals
	PW2.E03.fp04	focus panel	Focus panel explains sexual selection in mammoths, mastodons, bison, and musk ox.	Horns, tusks and antlers signal identity for large plant eating mammals.	The horns and tusks you see on the musk ox, mammoth, mastodon, sheep, and buffalo are all used for a very important purpose: mating and recognition of one's own species. Signals such as these allow males to showoff for females, and also prevent closely related species from mating. Similarly, changes within these signals can often lead to the creation of a new species of animal. (BG)		

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	PW2.E03.ar01	artifact label	Label for mammoth material		One of the most common fossils found in Pleistocene deposits from Utah is the mammoth. Elephant-like, but larger. It had smaller ears, much more fur and a large hump on its back. (BG) Mammoth and mastodon teeth are very different and can be easily identified. The mammoth tooth is almost flat on top, but with undulating ridges running across. The mastodon tooth has six high cones. Both animals grind plant material across their teeth, but since they descended from different ancestors, their teeth look different. Most scientific studies today have determined that both the mastodon and the mammoth eat very similar diets including grass and tree leaves. (BG)	Mammoth skull A0377, tusk A0128, baby mammoth jaw A0385	outline drawing with bones shown
	PW2.E03.ar02	artifact label	Label for mastodon material		Mastodons are not common in Utah, more so in Idaho. Specimens have been found here though. Similar to mammoths, but differed in being stockier, flatter faces, and lacking the large hump. (BG)	skull A0471	outline drawing with bones shown
	PW2.E03.ar03	artifact label	Label for musk ox material		Musk oxen thrive in cold climates. During the Pleistocene when the climate was colder in Utah, musk oxen were common. But as the climate changed to be warmer, they could not tolerate it and went locally extinct. Today, they are found only in the mountains of Asia, where temperatures are still cold. (BG) These very hairy and shaggy animals were very common on the shores of Lake Bonneville. The UMNH has one of the largest collections of fossil musk ox skulls in the world. They fed on ground plants including grass and sedges. (BG)	skull A1663, partial skull A1664	outline drawing with bones shown
	PW2.E03.ar04	artifact label	Label for Ovis canadensis material		Another ancient herbivore is the mountain goat. Its most common remains are in the form of its horns, which are large and durable. These animals lived the same way modern mountain goats live, eating plants from the tops of the Wasatch Front. However, these mountain goats went extinct in Utah, and those on today's Wasatch and Uinta ranges are reintroduced.	skulls A1665, 1666, 1667, 1668	outline drawing with bones shown
	PW2.E03.ar05	artifact label	Label for Camelops material		Not as common are camels. It is hard to believe that camels actually walked on the shores of the Salt Lake Valley.	partial skull A1669; axis A1716; maxilla fragment A1717	outline drawing with bones shown
	PW2.E03.ar06	artifact label	Label for Bison material		Bison is another common member of the Bonneville fauna. It is closely related to the modern Bison bison and probably led a similar lifestyle, living in herds and grazing ground plants. There is no evidence thus far for the very large horned Bison latifrons in Utah, only Idaho. (BG)	partial skulls A1661, A1663, A1722	outline drawing with bones shown
	PW2.E03.fp01	focus panel	Focus panel text discusses different predator techniques. (with map of find and photo of Park City site, diagrams/illustrations of skulls with features noted)	How did these top Ice Age predators hunt? Their skulls offer clues.	The two top predators during the Pleistocene age of Utah were the Dire wolf and the Saber-toothed cat. The skulls of these predators were very different, each employing a different set of weapons to take down their prey. Both of the animals had large jaw muscles, indicated by the large crest on top of the head. The larger the crest, the larger the muscles that attached there. Fossil remains of these animals from Utah are fragmentary. The skulls you see here are from La Brea.	Smilodon and Canis dirus skulls	map of find and photo of Park City site, diagrams/illustrations of skulls with features noted

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	PW2.E03.ar08	artifact label	Label for Canis dirus material		The dire wolf probably had a life style similar to the modern grey wolf, but it differed as well. Its limbs are shorter and slightly stockier than the grey wolf, suggesting that it ran slower. Running fast may not have been necessary if they hunted large prey. Dire wolves may also have been prolific scavengers, because their back teeth–the molars–show lots of evidence for bone grinding. (BG)	A1721a-? Canis dirus cast skull and real skeleton	outline drawing with bones shown
	PW2.E03.ar09	artifact label	Label for Arctodus material		The giant short-faced bear was a formidable predator, being larger than the grizzly. Although it also likely had habits similar to modern bears that eat both plants and animals on a regular basis. This is called being an omnivore. (BG)	A1191 partial skull	outline drawing with bones shown
PW2.E04 Herbivore/ Carnivore				You can use your hands and eyes to make discoveries about Ice Age mammals by identifying the meat and plat-eaters at an Ice Age dinner party and putting together a baby mammoth skeleton.			
	PW2.E04.si01	section intro	Title and subhead on wall		Utah's fossil record		
	PW2.E04.qt01	quote/question	Quote/question on back wall				
	PW2.E04.ap01	activity prompt	Put together the baby mammoth skeleton.	Connect the bones and put the baby mammoth back together.			
	PW2.E04.in03	interactive	Ice Age Dinner Table	Herbivores and Carnivores make different choices at mealtimes.	The visitor uses a rotating finger wheel to dial-in one of three possible meal images into view within a round window that represents a dinner plate. Ratchets in the turning mechanism provide centering for meal images within windows and also offers resistance between selections. When the right meal is selected a sound is heard followed by a short audio description.		cave bear, giant ground sloth, mammoth, dire wolf, bison or camel
	PW2.E04.ap03	activity prompt	prompts visitors to match the mammal with their dietary habits		Can you tell the plant eaters from the meat eaters? Hint: the meat-eaters have sharp teeth like knives or scissors.		
UPPER LEVEL							
PW2 Lake Bonneville							
	PW2.si01	section intro	Section intro orients visitors to the Lake Bonneville ecosystem.	The Ice Age of Utah would have looked like a strangely familiar place, but with exotic animals and lusher vegetation. A world similar to ours, yet hauntingly different.	If you could travel back 11,000 years, there would be (of course) no museum; you would be standing on the shores of an enormous Ice Age Lake, Lake Bonneville. You would see mammoths and mastodons, sabretooth cats, camels, giant ground sloths, and dire wolves. Some of these animals would look very familiar, others would be unfamiliar. As you look at their skeletons, try to imagine seeing them alive, as the first humans in the Salt Lake area did. What happened to these Ice Age animals? Many went extinct, others have relatives in other parts of the world. Musk ox live in Asia today, elephants live in Africa and Asia, sloths live in South America.		timeline graphic, map of Bonneville fossil localities
PW2.E01 Lake Bonneville Fauna			Visitors see skeletons of Ice Age animals, and learn how animals very like today's lived in a very different climate.				
	PW2.E01.pm01	photo mural	Background mural depicts Lake Bonneville approximately 12,000 ya. Focus is on the lake and surrounding plants.		caption: shore of Lake Bonneville, 11,000 years ago, Provo Shoreline Equivalent		
PW2.E01.gr01		graphic rail					

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	PW2.E01.ms01	mindset panel		12,000 years ago, animals much like those alive today lived in what is now Salt Lake City such as bears and wolves. Many of these species are still alive, but some are extinct. Others, like the Mammoth and Sloth have relatives that live elsewhere in the world today.	During the Ice Ages, local glaciers filled Utah's canyons, including Big and Little Cottonwood Canyons, and melt from these glaciers fed into a giant lake, Lake Bonneville that filled much of the Great Basin. On the shores of the lake lived mammoths, mastodons, giant ground sloths, sabertooth cats, and cave bears. Their bones are found along the Wasatch Front in gravel quarries, and even in Research Park, near the museum. Ice Age North America has been called a "cold Serengeti" - what happened to these large mammals? Some left descendants here, but many became extinct. The Ice Age climate was colder and wetter, and conifer trees now found naturally at higher elevations grew around the shores of the lake.	Mounted skeletons of A0129 Platygonus, A0130 Mammuthus adult and A0898 baby, A0134 Canis dirus, A1040 Arctodus simus, A0131Megalonyx	image of scene with animals, dig site photos
PW2.E01.id01		id label	Who's who illustration/label identifies the animals represented by skeletons, and indicates their roles in the ecosystem, and where the fossils were found photos of the area today already done.		Platygonus, Mammuthus adult and baby, Canis dirus, Arctodus simus, Megalonyx, Smilodon, Bison, Teratornis name, scientific name, size, what it ate, other connections/fun facts tbd		fleshed out images of each animal
	PW2.E01.gc01	graphic caption	Graphic captions accompany graphs and charts of climate change	The earth's climate has changed dramatically in geologic time, and now in historic time. Understanding past climate change may help us understand the consequences of global warming.	Scientists distinguish "icehouse" earth (today we live in an icehouse earth) and "greenhouse" earth. Most of the millions of years of earth's history has been greenhouse earth. The icehouse is relatively recent (the past 2 million years); we humans and these Ice Age mammals evolved in an icehouse earth. By studying ancient ice cores and micro-organisms, scientists learn about the abrupt changes from icehouse to greenhouse, and how they affect life on Earth. Recently humans have introduced tremendous levels of carbon dioxide into the atmosphere, causing climate change on a global scale. Similar changes proceeded ancient shifts from icehouse earth to greenhouse earth. Are we accelerating a possible shift? Climate change as the Ice Age became warmer may have contributed to the extinction of the large mammals at the end of the Ice Ages. Some scientists have speculated that the coming of humans, hunting these large animals, may have contributed to their extinctions.		timeline/graph of past climate fluctuations
	PW2.E01.gc02	graphic caption	Captions accompany a food web diagram of the Lake Bonneville ecosystem	Just like ecosystems of today, the animals of the Pleistocene were part of an energy flow, divided into producers, carnivores and herbivores.	The Pleistocene is distinguished by its "mega-fauna" - giant beavers and ground sloths, mammoths and mastodons, enormous bears. Yet, like today, these big creatures were supported by a myriad of plants and animals. North American looked more like an African savannah, with sabertooth cats attacking bison or mammoths. The plant eaters were either grazers (eating grass, like horses do today) or browsers (leaf eaters, like giraffes) or both.		Lake Bonneville food web graphic w/caption
PW2.E02 Bison Attack			Visitors see a dramatic mount of a sabretooth cat attacking a bison, and compare this attack to that of modern big cats			Mounted skeletons of Smilodon, Bison antiquus, Teratornis above	
PW2.E02.gr01		graphic rail					

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	PW2.E02.ms01	mindset panel	Mindset panel describes the scene, gives the evidence for Smilodon attack, and cites modern analogies.	We infer the behavior of extinct animals from that of their living relatives.	You're watching as a sabertoothed cat attacks a bison. Smilodon was a powerfully built predator, but scientists aren't sure how it hunted, or whether it hunted in packs. Recent scientific work suggests that they used their powerful legs to pull down prey and then slashed the victim's neck. These researchers concluded that : Our results demonstrate that bite force driven by jaw muscles was relatively weak in S. fatalis, one-third that of a lion (Panthera leo) of comparable size, and its skull was poorly optimized to resist the extrinsic loadings generated by struggling prey. Its skull is better optimized for bites on restrained prey where the bite is augmented by force from the cervical musculature. We conclude that prey were brought to ground and restrained before a killing bite, driven in large part by powerful cervical musculature. Because large prey is easier to restrain if its head is secured, the killing bite was most likely directed to the neck.	Mounted skeletons of A0133 Smilodon, Bison, A0900 Teratornis above	with fleshed-out images of Smilodon and Bison, photograph of modern similar attack
	PW2.E02.fp02	focus panel	Focus panel text discusses different predator techniques. (with map of find and photo of Park City site, diagrams/illustrations of skulls with features noted)	How did these top Ice Age predators hunt? Their skulls offer clues.	The two top predators during the Pleistocene age of Utah were the Dire wolf and the Saber-toothed cat. The skulls of these predators were very different, each employing a different set of weapons to take down their prey. Both of the animals had large jaw muscles, indicated by the large crest on top of the head. The larger the crest, the larger the muscles that attached there. Fossil remains of these animals from Utah are fragmentary. The skulls you see here are from La Brea. (BG)	Smilodon and Canis dirus skulls	map of find and photo of Park City site, diagrams/illustrations of skulls with features noted
PW2.E02.fl01		family label	Family label about sabertooth cats	Sabertooth cats were good hunters.	Imagine if your canine teeth were more than 4" long! If you were a sabertooth cat, you would be a powerful predator, with strong legs, and a slashing bite. You might have heard of Smilodon, the Ice Age sabertooth. Did you know that there were many different sabertooths, here in North America, and in Australia and South America?	cast discovery saber-tooth	images of thylacosmilus, South American sabertooths
PW2.E05 Bird Evolution			Standing at the rail in Lake, overlooking Past Worlds, visitors can see the skeletons of large fossil birds (*Teratornis*), and other, earlier fossil birds in the distance.				
PW2.E05.gr01		graphic rail					
	PW2.E05.ms01	mindset panel	Mindset panel reviews bird evolution.	Birds evolved from small meat-eating dinosaurs.	Birds evolved from meat-eating dinosaurs. They are now arguably the most successful group on the planet, diverse in size and habitat, ranging over most of the world and in the oceans. Bird bones are light, and rarely fossilize, so the bird fossil record is not extensive. More bird fossils have been found since 1990 than in the previous centuries, and our understanding of bird evolution is growing. Early members of the bird lineage like Archaeopteryx, have many dinosaur features. These early birds gave rise to birds like Presbyornis, a water bird related to ducks, and Teratornis, an Ice Age vulture.	Teratornis, Presbyornis, Archaeopteryx	bird evolutionary tree; images of Teratornis, Presbyornis, Archaeopteryx; image of raptor dinosaur
	PW2.E05.gi01	graphic image	birds on exhibit are highlighted on a tree of birds.		caption: tree of birds		

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	PW2.E05.ar01	artifact label	label for Teratornis		Teratornis had a wingspan of 12 feet! This large bird preyed on mammals and, some scientists think, fish. It was an active predator, not a scavenger like modern condors and vultures. Although Teratornis looks like a giant condor, it is more closely related to hawks and eagles according to dna analysis. Early humans lived at the same time as Teratornis - imagine seeing this giant condor flying overhead. Teratornis bones have been found in middens (garbage dumps) of early humans, showing that they were hunted for food. The remains of hundreds of Teratornis have been found at Rancho La Brea tar pits		Teratornis image, condor image, outline drawing with bones shown
PW3 Eocene							
	PW3.E01.pm01	photomural	artists mural	forest showing palms, sumac, sycamore, ferns, walnut, fig trees; small horse Hyracotherium peeping through trees; Copelemur primates in trees	caption for artist's mural		
PW3.E01 Eocene Lakeshore			Visitors see the residents of an Eocene lakeshore, and see how that ecosystem resembles modern ecosystems.			Eocene lakeshore with fossil mounts uintathere, Patriofelis,Copelemur, Presbyornis; Presbyornis nests, tracks, and eggs on shore; croc nest on shore; stromatolite reef with caddis fly swarm	
	PW3.si01	section intro	Section intro orients visitors to the Eocene exhibits.	The Eocene was warm and tropical; many different kinds of mammals evolved to fill niches left by the dinosaurs.	Now you're at the shores of an ancient lake, about 50 million years ago. At this time, a series of large lakes covered much of the west. It's warm, almost tropical, and there are some familiar trees, like sycamores and palms. Some of the animals, like the plants, look familiar - can you spot the lemur-like primate? Some animals, like crocs and turtles will seem as if they haven't changed at all. You can see them in the underwater part of this tableau.		map, timeline graphic
PW3.E01.gr01		graphic rail					
	PW3.E01.ms01	mindset	Mindset panel describes the Eocene ecosystem, the detailed preservation in lakes, and notes that this is one of the first ecosystems with large mammals.	50 million years ago in Utah, strange mammals lived in and around an ancient lake. This is one of the first ecosystems in which large mammals dominated.	In the Eocene, about 47-50 million years ago, a series of lake-filled basins formed in Utah, Wyoming, and Colorado. They grew and shrank, and eventually filled in, fine sediments burying an incredibly rich array of fossils, from plants to fish, insects, and mammals. The lake was deep, and probably lacked oxygen, so the remains didn't decay. In these exceptional conditions, plants and animals that rarely become fossils were preserved, including an early bat (and its last meal!). The Eocene climate was warmer and more tropical than today's, and palm trees grew along the shores of the lakes. This sub-tropical lake ecosystem is one of the earliest with large mammals, like the plant-eating uintathere seen here.		digsite photos, scene with animals
PW3.E01.id01		id label	Who's who illustration/label w/ color changing film slides outlines the ecosystem players and trophic structure;			uintathere, Patriofelis, Copelemur, Presbyornis and nest, croc nest	fleshed out uintathere, Patriofelis, Copelemur, Presbyornis and nest, croc nest
PW3.E01.gr02		graphic rail					

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	PW3.E01.fp01	focus panel	Focus panel discusses mammals filling roles played by dinosaurs in ecosystems	The Green River is one of the first ecosystems with large mammals.	About 55 to 50 million years ago, in the Eocene, mammals evolved rapidly. This is shown both in the fossil record, and in recent molecular studies of the mammal phylogenetic tree. This rapid evolutionary burst might be related to changing, warmer climates, and the evolution of new kinds of plants. Many of the mammals of the Eocene are members of extinct lineages, like the uintathere. Others, like Copelemur, are members of living lineages (in this case primates). One of the earliest horse and the first bat are known from Eocene rocks. Although these animals make look unfamiliar, they are playing recognizable ecological roles. The uintathere is a plant-eater, browsing on leaves and plants like rhinos do, Patriofelis, a creodont, is a meat eating predator, and Copelemur, a lemur-like primate, feeds on fruit and leaves in the trees.	uintathere, Patriofelis, Copelemur, Presbyornis and nest, croc nest	fleshed out images of Eocene mammals and photos of modern analogues
	PW3.E01.gc01	graphic caption	Graphic captions for the Green River ecosystem diagram.	The Green River is one of the best known fossil ecosystems.	Paleontologists reconstruct ancient ecosystems by analyzing the fossils found in a particular site and comparing the animals and plants to modern analogies. Information on the diet of fossil animals comes from coprolites and from analysis of preserved gut contents. Because the preservation is so good in the Green River Formation, members of the ecosystem like dragonflies, crayfish, shrimp, and plants are preserved. There are 25 species of fish, ranging from small minnows to massive gars, which were 6 feet long and armored in giant diamond-shaped scales. There are even stingrays preserved in the sediments of Fossil Lake, though modern freshwater stingrays are restricted to the Amazon basin in South America. Many of the fish (and other organisms) are concentrated in particularly rich layers that show massive die-offs in the lake community. The sediments of the Green River add to the details of the ecosystem. Geologists distinguish upland forests deposits, shoreline, carbonate mounds left by caddis-fly covered stromatolite reefs, and nearshore and deep lake environments.		Green River geologic column/chart; photos of Green River sediments Why the geologic column. It does not seem to have a purpose. The picture should be fine.
PW3.E02 Eocene Tableau			Visitors stand "underwater" to see the teeming life of the Eocene lake, represented in models and real fossils. They observe the micro-and macroscopic life of the lake and learn how hydrocarbons formed.				
PW3.E02.gr01		graphic rail					
	PW3.E02.ap01-	activity prompts	Instructions for stratigraphy game		Pull out the drawers to find out more about the layers of the Green River lake.		
	PW3.E02.fp01	focus panel	Focus panel for stratigraphy basics.	Sediment stacks in layers like a book with the oldest layers on the bottom and the youngest on the top.	In lakes, sediment falls through the water and is deposited at the bottom. Sediment layers build up, one on top of another. Anything that falls through the water (a plant leaf, a dead fish) gets buried in the sediments. If the sediments aren't disturbed, the bottom layers are older and the top layers are younger.		stratigraphic column of Green River formation

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
PW3.E02.id01		id label	scene id for Eocene tableau		Reconstructed underwater scene based on Eocene fossils and sediments	stromatolites, bowfin, crayfish, gar, caiman, Hyracotherium, softshell turtle, school of fish, snapping turtle, crocodilians, mosquitoes, damselflies, caddisfly	fleshed out reconstructions
	PW3.E02.fp02	focus panel	Focus panel shows how hydrocarbons formed in the Green River formation.	Need an object or remove this text. Maybe a sample of oil shale from Bonanza utah?	The term oil shale is sedimentary rock that release petroleum-like liquids heated. Oil shale was formed millions of years ago by deposition of silt and organic debris on lake beds and sea bottoms. Oil shales in the Green River Formation produce oil and natural gas. Oil shales form in lakes like Lake Uinta when large quantities of plants and animals (ostracods, diatoms, algae) accumulate on the lake bottom. Oil shale in the Green River Formation is found in five sedimentary basins: Green River, Uinta, Piceance Creek, Sand Wash and Washakie. The first three have undergone some significant investigation and attempts to commercialize the oil shale reserves since the 1960s. Over long periods of time, heat and pressure transformed the materials into oil shale in a process similar to the process that forms oil; however, the heat and pressure were not as great. Oil shale generally contains enough oil that it will burn without any additional processing, and it is known as "the rock that burns".	artifact tbd	
PW3.E02.rc01		rail case	rail case for hydrocarbon specimen				
	PW3.E02.ar01	artifact label	Touch a stromatolite		Please touch and stromatolite ID Stromatolites in Eocene Green River Formation: ABSTRACT Ronald C. Surdam, J. L. Wray, L. L. AAPG Bulletin Volume 62 (1978) The stromatolites in the Green River Formation are of two types--algal or tufa. The algal stromatolites are similar both in internal fabric and external morphology to the stromatolites at Shark Bay, Australia. The tufa stromatolites are similar in internal fabric and external morphology to the tufa deposits at Mono Lake, California. The algal stromatolites in the Green River Formation commonly form thin sheets. The thickness of these sheets can be related to the topographic gradient at the site of deposition. In contrast, the tufa deposits are mound shaped (bioherms). The position of these mounds commonly is related to faults associated with tectonically active areas in the ancient lake basins.	stromatolite touch fossil tbd	diagram of stromatolite; photo of Green River stromatolite reef faces
PW3.E02.gr02		graphic rail					

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	PW3.E02.ms01	mindset panel	Mindset panel describes the underwater ecosystem of Green River	Fossil preservation of this Eocene lake is astounding, allowing us to reconstruct the details of this ancient underwater ecosystem.	Here you are looking into the waters of ancient Lake Uinta. We can piece together this scene, because the fine-grained siltstones and limestones of the Green River formation preserve thousands of fossils, primarily fish and plants. There are 25 species of fish, ranging from small minnows to massive gars, which were 6 feet long and armored in giant diamond-shaped scales. There are even stingrays preserved in the sediments of Fossil Lake, though modern freshwater stingrays are restricted to the Amazon basin in South America. Many of the fish (and other organisms) are concentrated in particularly rich layers that show massive die-offs in the lake community. Many of the animals, like the gar, caiman, and the turtles, are identical to their modern relatives, allowing us to infer their behavior with confidence.		foodweb diagram
PW3.E02.fl01		family label	family label for tableau		Can you see the crocodile? Crocodiles have been around for a long long time. This one lived millions of years ago, in Wyoming. The crocodile fossil tells us that Wyoming must have been hotter and wetter then, more like parts of Asia or Africa today.		
	PW3.E02.sx01	special exhibit	diatoms and magnifier/ microscope		instructions for magnifier/microscope		
	PW3.E02.in02	interactive	Stratigraphy interactive—visitors pull out stratigraphy layer drawers to see the Green River fossil sequence. Layers include: hydrocarbons/shale, vertebrate poop, Undichnus, fish fossils, ostracods, nothing/sediment, partial crocodile, leaves, turtle.	The drawers represent layers of the Green River system - pull them out to see what's in them and what's older.			
	PW3.E02.ar01	artifact label	Label for hydrocarbon layer.	The hydrocarbon layer is composed of the bodies of millions of microscopic plants and animals.	Hydrocarbons or oil shales are dark, black and shiny. This layer comes from microscopic organisms that die and accumulate in the bottom of the lake. The most common organisms include ostracods, diatoms, and algae. The carbon in these animals bodies collects and over time changes into hydrocarbons. Hydrocarbons (oil and natural gas) are (unfortunately) a vital and non-renewable resource. It takes millions and trillions of these microscopic plants and animals to make oil and natural gas. (BG w. MKS editorializing)		
	PW3.E02.ar02	artifact label	Label for vertebrate poop layer.	In the lake system, one animals poop is another animal's energy source.	This layer of medium to dark brown lumps and "slug-like" shapes represents the poop of vertebrates that lived in the lake. The lake is a self-contained environment; the energy in the lake stays there. After fish, turtles and crocodiles eat, their body retains some of the energy, but some is excreted as poop. This becomes a fuel source for other organisms. (BG)		
	PW3.E02.ar03	artifact label	Label for Undichnus layer.	This layer is the trace fossil left by a fish tail on the lake bottom.	Undichnus is a trace fossil. You can see it as a thin sinusoidal line depressed into the sediment. Trace fossils record the activity of animals - their footprints, the wiggles they make through sand, their burrows. Sometimes all that remains of an organism is a track. The track here was made by a fish tail oscillating from side to side as it swims. We don't know which fish made this track, but there were many fish swimming in the lake 50 million years ago. (BG)		

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	PW3.E02.ar04	artifact label	Label for fish fossils.	Several layers of mass burials have been found in the lake.	Some of the lake layers record what might be mass burials. This layer of sediment shows many Knightia fish lying in different sizes. There are many different sizes of fish, but they are all one species, Knightia sp. We aren't sure if all the fish died together or how long it took. (BG)		
	PW3.E02.ar05	artifact label	Label for ostracod layer.	Scientists can use ostracods, small shelled animals, to decide if a layer is older or younger, since the kinds of ostracods in the lake change over time.	Ostracods are small clam-shaped animals, but more closely related to crabs. This is a dense layer of ostracods, one of the most common animals in the ancient lake. These are *Hemicyprinotus watsonensis.* Ostracods are animals related to crabs and shrimp that have a hinged shell like a clam. Layers of the lake are aged by changes in the type of ostracod higher or lower in the lake sediments. This layer comes from the middle age of the lake. (BG)		
	PW3.E02.ar06	artifact label	Label for sediment layer	Most of the ancient lake layers are sediments without fossils.	Most of the geologic record doesn't contain fossils; it's layers of sediments are barren like this one. Paleontologists must look through lots of sediments before they find any fossils. Fossils are rare and must be protected. (BG)		
	PW3.E02.ar07	artifact label	Label for crocodile layer.	Several kinds of crocodiles and caimans are known from the ancient lake; they were among the top predators.	This is the skeleton of a partially disarticulated crocodile skeleton. Crocodiles were one of the dominant predators of this ecosystem. There are usually fewer predators in ecosystems, so finding a fossil predator preserved is rare. (BG) The presence of crocodiles in the lake indicates that the climate then must have been tropical.		
	PW3.E02.ar08	artifact label	Label for leaf layer.	Leaf fossils in the lake come from the trees that lived along its shores.	This is a layer of leaf impressions scattered across the sediment. The leaves preserved in the lake tell us what kinds of trees lived on the lake margins 50 million years ago. There are many examples of leaves that look very similar to modern trees. Do you think this leaf layer was caused by seasonal shedding of leaves off trees? This is an example of a question that a scientist would ask of this site. (BG) Can you spot the sycamore leaf?	Platanus wyomingensis, Swartzia wardelli, Engelhardtia uintaensis, Acer lesquereuxi, Populous wilmattae	
	PW3.E02.ar09	artifact label	Label for bird or bat layer.	Not just animals that lived in the lake are preserved in the lake.	Not just aquatic animals like fish and turtles are preserved in the lake. Sometimes flying animals such as birds or bats fall into the lake while trying to catch insects or fish, and sink to the bottom, get covered with sediment, and become preserved in the fossil record. Only a handful of bats have been recovered from these Eocene fossil lakes. Birds are more common, and feathers are abundant in some areas. (BG)	fossil tbd I would prefer a bat, because birds are seen above	
	PW3.E02.ar10	artifact label	Label for turtle layer.	Turtles, common in lakes today, lived in the ancient lake.	In the ancient lake, like in modern lakes, turtles are quite common. Unlike in most deposits, where turtles are represented by only shells and pieces of shells, the turtles in this lake are usually whole skeletons. (BG) Several different kinds of turtles lived in the lake, including soft-shelled turtles and snapping turtles.	Echmatemys	
	PW3.E02.qt01	quote	Quote addresses the passage of time revealed in stratigraphic layers				
PW3.E03 Green River Case			Visitors see trace fossils, and fossils of Green River fish, insects, plants, reptiles, and mammals.				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
PW3.E03.ca02		case	Case with Green River fossils and trace fossils: fish, crocs, turtles, plants, insects, etc. (Undichnus)				
	PW3.E03.ct01	case title	Title and subhead		Green River fossils Green River formation extends through Utah, Wyoming, and Colorado; these basins were lakes; now they hold fine-grained sediments that record fine details of the plant and animal life in and around the lakes.		photo of Green River formation, dig site
	PW3.E03.ms01	mindset panel	Mindset panel describes Green River diversity	In the Green River formation, we find astounding fossils that record the biology and behavior of vertebrates that lived in the lake.	The early Eocene was the final episode of warm "greenhouse" climates on Earth, when the climate was warmer from the tropics to the poles (alligators could live above the Arctic Circle). Partly because of these warm climates, Eocene animals, plants, and insects were very diverse. This amazing diversity is recorded around the globe, from Germany, to South Africa, to the Western United States. The Green River lakes covered 50,000 square miles of Western North America, and are one of the richest fossil localities in the world. Green River deposits preserve the fine details of more than 60 different kinds of mammals, fish, reptiles, and birds, and more than 150 different plants.		
	PW3.E03.ar01	artifact label	Artifact label describes Green River fish and rays.	Many kinds of fish have been discovered in the Green River lake system.	Fish were one of the most abundant organisms in the Green River lake system. The most common group of fish found in the lake are the bony fish. These are fish that have calcium-hardened bones like humans. Which fish do you think ate each other? Freshwater rays, relatives of the sharks, have been recovered from the Green River Formation. This great specimen shows the wing and head shape very well. Preservation of this quality is scarce in rays because their bones are cartilage, not hardened bone like ours or those of bony fish. (BG) Do these fish look like modern fish, say a perch or a herring? Some are related to those modern fish. plus artifact ids	A1470, 1471, 1472, 1473, 1475, 1476, ray A1469	
	PW3.E03.ar02	artifact label	Describes Green River plants	Green River, known for its fish fossils, is also a rich source of plant fossils, which in turn give us clues about the past climate and ecosystem.	The magnificent fossil leaves preserved in the Green River Formation do not reflect the aquatic ecosystem, but instead are terrestrial organisms that fell into the lake. (BG) The Green River plants include palms, cat-tails, sycamores, and other familiar plants from North America, but also some that are today more common in, or restricted to, eastern Asia. More than 150 genera of plants are represented. About 30% of the genera are endemic to the region. The climate appears to have been more subtropical than at present, much more like the Gulf Coast region of today. There are also woodland forms, such as hackberry, sycamore and sumac as well as lakeside forms like willow and cottonwood. plus artifact ids	A1479, 1751, 1752, 1754, 1755, 1756, 1757, 1758, 1759, 1760, 1761, 1762, 1763, 1764, 1765, 1766, 1768, 1770, 1771, 1774, 1775, 1781, 1777, 1780, 1790, 1791, 1792, 1793, 1794, 1795, 1796, 1797, 1798, 1799	

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	PW3.E03.ar03	artifact label	Describes Green River insects and arthropods		The insects and arthropods from the Green River Formation are just as spectacular as the plants or fish. The preservation of some fossils is good enough to allow not only identification to family and subfamily, but will sometimes show color patterns, wing venation, and sex-related characters. Unlaid eggs have been identified in some crane fly fossils! Among the insects found are caddisflies, represented by carbonate mounds up to 9 m tall and 40 m in diameter formed in the nearshore environment of Eocene Lake Gosiute. These mounds formed as stromatolites and sediments covered a core of larval cases. Caddisflies hatch all at once, leaving their cases behind. Other Green River insects are dragonflies, crickets, wasps and beetles. Many kinds of spiders are also known from Green River. plus artifact ids	insects A1767, 1772, 1773, 1776, 1778	
	PW3.E03.ar06	artifact label	Label for bat or bird	Non-aquatic animals are preserved in the lake, too.	Other terrestrial organisms have been found in the lake, such as this bat or bird. They could have been trying to catch insects or small fish, then fell into the lake and drowned. (BG)	A1480; feather A1753	
	PW3.E03.ar07	artifact label	Label for Presbyornis plaque			A0376	
	PW3.E03.ar08	artifact label	Label for Uintathere skull			A0122	
	PW3.E03.ar04	artifact label	Label for procaimanid, crocodilians	Caimans and crocodiles were top predators in the 50-million-year-old lake.	These animals, relatives of today's crocodiles, were the top predator once they obtained large size. Until then, they could become the prey of any fish or alligatoroid larger than them. (BG)	procaimanid A1477; croc skulls A1552, 1569	
	PW3.E03.ar05	artifact label	Label for turtles	A variety of turtles are found in the lake.	Turtles would also have been prey and predator, depending on their size and shell hardness. (BG) Soft-shelled turtles eat insects, and are amore likely morsel for a hungry crocodile than a large, hard-shelled snapping turtle. Snapping turtles eat insects, fish, birds, mammals, and smaller turtles.	Trionyx A1478, Echmatemys A1553, Baptemys A1554	
PW4 Late Cretaceous							
	PW4.si01	section intro	Section intro orients visitors to the Cretaceous exhibits.	You have now traveled back to southeast Utah in the age of dinosaurs, about 75 million years ago. Much of what we know about this area and time comes from the recent work of UMNH researchers, and many of these dinosaurs and other fossils are new to science. You'll see a hadrosaur with preserved skin, a baby hypsilophodontid, and the latest discoveries.	These dinosaurs come from the Kaiparowits Formation of the Grand Staircase National Monument. They lived in Utah about 75 million years ago. The climate was humid, subtropical, with lots of ponds, lakes, and rivers, like today's Mississippi Delta. Nearly every species paleontologists are able to identify from this time in southern Utah is a new species. (BG) We have discovered a fair amount about this ecosystem - from the plant-eating dinosaurs and insects, to meat-eating dinosaurs, small mammals, turtles, lizards, and fish. On this platform we've divided the meat eaters and the plant eaters - can you spot the differences?		map, timeline graphic

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
					"The region is a kind of last Eden of dinosaur paleontology in North America."" Scott Sampson The Kaiparowits formation is one of the best records of late Cretaceous land life between 76 and 74 million years ago. In the Grand Staircase Escalante National Monument, the Kaiparowits is represented by mudstones, siltstones, and sandstones, the remains of ancient streams and levees. Today Grand Staircase is dry, red rock country, but in the late Cretaceous, when a large seaway split the continent, it was part of "West America," a moist and humid environment."		
	PW4.E01.qt01	quote/question	Quote/question on west wall	about the Cretaceous environment/ecosystem			
PW4.E01 Meat Eaters			Visitors see skulls and skeletons of some of the meat-eaters who lived in what is now Grand Staircase Escalante National Monument about 75 million years ago, and will learn how these members of the GSENM Cretaceous food chain made their livings.				
	PW4.E01.pm01	photomural	artist's mural showing conifers, araucaria, shrubs		caption for mural: southeast Utah 75 million years ago		
PW4.E01.gr01		graphic rail					
	PW4.E01.ms01	mindset	Mindset panel describes the carnivorous dinosaurs from the Kp.	Raptors (feathered dinosaurs), the ancestors of birds, flourished at the end of the age of dinosaurs.	The skeletons of carnivorous dinosaurs are not very common in the Kaiparowits Formation, but paleontologists have been able to tell that they were diverse. At least five different types of carnivorous dinosaurs have been discovered, the majority of which are raptor dinosaurs, likely covered in feathers during life (3-4 types of raptors). The largest carnivore is a new species of tyrannosaur. Additionally a giant crocodile closely related to the modern Alligator dominated the aquatic environments. Together, these carnivores managed to make use of all available food sources from tiny mammals, and lizards to giant hadrosaurs and ceratopsians, to gar fish and crocodiles.	Cast mounts of tyrannosaur, juvenile tyrannosaur, Deinosuchus skull, Hagryphus, troodontid, dromaeosaurid	recreated scene with animals
PW4.E01.id01		id label	Who's who illustration/label w/ color changing film sliders identifies the meat-eaters; photos of a modern analogous scene are compared to the scene in the mural.				fleshed out tyrannosaur, Hagryphus, troodontid, dromaeosaurid, Deinosuchus
PW4.E01.fl01		family label	Family label about the juvenile T. rex.		One of the skeletons in front of you is a young tyrannosaur (relative of T. rex). Can you spot the one that looks like a mini T. rex? Tyrannosaurs were about 3 feet long when they hatched, and grew to more than 40' long!		
PW4.E01.gr02		graphic rail					

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	PW4.E01.fp01	focus panel	Focus panel outlines carnivore niches, hunting and scavenging, and points to skeletal evidence.	Large and small theropods probably filled different niches.	The theropods groups in the Kaiparowits are the same as are found in other areas of northern North America, but different species. Large and small theropods likely filled different niches, killing different animals; all were scavengers. We don't know the diet of some theropods. The skeletons shown here are all new species. (BG) Hagryphus, an ostrich-sized, fast predator, might have eaten small mammals and reptiles. Troodontids had long legs, large eyes that faced front, and may have chased down small animals. Tyrannosaurs would have killed most anything that they were able to catch, obviously the larger the tyrannosaur the larger prey could be killed. The Deinosuchus would have eaten anything that got too close to the water.		
PW4.E01.rc01		rail case	rail case			maniraptoran fossils including claws, teeth, limb bones	images of fleshed out raptors
	PW4.E01.ar01	artifact label	Label for raptor and theropod material		This is the real evidence that we have for the raptor dinosaurs in the Kp. The species are likely to be new to science, but we currently only have a rudimentary understanding of their anatomy. (BG) Raptors are the dinosaur group that gave rise to birds. They were small-to-medium sized predators. They may have had feathers. Their feet had large claws and were used as deadly weapons. They had long arms, with joints that allowed their hands to fold in close to their bodies. Raptors had relatively large brains. They might have hunted in groups, but there is very little evidence for this.	raptor and theropod material tbd	outline drawing w. bones shown
PW4.E02 Plant Eaters			Visitors see skulls and skeletons of plant-eating dinosaurs from GSENM, including new finds, and learn about signaling structures and sexual selection.				
PW4.E02.gr01							
	PW4.E02.ms01	mindset panel	Mindset panel text describes the herbivores found in the Kp.	There were many different plant-eating dinosaurs in this ecosystem; they probably ate different plants or different parts of plants.	Many plant-eating dinosaurs are known from the Kaiparowits Formation, including Parasaurolophus, the very large duckbill Gryposaurus, and several horned dinosaurs. The environment of southern Utah during this period would have provided copious amounts of plant material for the herbivores, which came in a variety of sizes from giant 30 foot long hadrosaurs to 6 foot long pachycephalosaurs and hypsilophodontids. Therefore, all of the plant eaters probably divided up food resources from among different levels of the forest--each in its own niche just like animals today. Hadrosaurs and ceratopsians both developed specialized teeth for chewing plant material. Evidence in the fossil record shows that the number of teeth increased and grew closer together over time, resulting in a grinding surface. Hadrosaur teeth are smaller and more numerous than ceratopsian teeth. Ceratopsian teeth also have two roots, but hadrosaurs have one. (BG) Ceratopsians (horned dinosaurs) have teeth with double roots, long narrow beaks and shearing teeth	Ornithomimus, Utahceratops, Parasaurolophus, Gryposaurus; skulls of centrosaur and Chimaera	

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
PW4.E02.id01		id label	Who's who illustration label		Paleontologists once thought ornithomimids were predatory meat eaters. Now, the thinking is that they were plant-eaters. The evidence comes from a find of ornithomimids with gastroliths (stomach stones), perhaps indicating that they had gizzards. Their snout resemble those of ostriches, and contain a hard sheath (like your fingernails) that might have been used to filter plants from lakes and rivers or snip off leaves pr small herbaceous plants. Additionally, through their evolution, they have lost all their teeth making them ineffectual predators of large prey.	mounted skeletons of Ornithomimus A0117, Utahceratops A0114, Parasaurolophus, Gryposaurus A0844; skull of Eric ceratopsian A0399	
PW4.E02.gr02			Signaling Structures and Sexual Selection				
	PW4.E02.fp01	focus panel	Focus panel discusses hadrosaur and ceratopsian teeth and diet.	Hadrosaurs and ceratopsians had different feeding strategies. Look at the teeth and explore how they ate.	Hadrosaurs and ceratopsians both developed specialized teeth for chewing plant material. Evidence in the fossil record shows that the number of teeth increased and grew closer together over time, resulting in a grinding surface. Other herbivorous dinosaurs simply shredded, rather than grinding plant food. The evolution of similar chewing styles in different groups occurred independently as each group evolved. We can tell this by looking at differences in the jaws. Hadrosaur teeth are smaller and more numerous than ceratopsian teeth. Ceratopsian teeth also have two roots, but hadrosaurs have one. (BG)		illustration of hadrosaur jaw, ceratopsian jaw; diagrams of jaw action
	PW4.E02.fp02	focus panel	Focus panel explains signaling structures and sexual selection	The horns and frills of ceratopsians, and the crests of hadrosaurs, are visual signals for others of their kind.	Modern animals use size, adornment, behavior, and color to distinguish between the sexes. The crests and large noses of hadrosaurs and the frills and horns of ceratopsians might have been sexual signals. If this was true, we would expect that males and females would have different size, shape or color display structures. We can't tell the color of hadrosaur and ceratopsian males and females, but we do see variations in frill and crest size and patterns. Most paleontologists attribute these differences in crest shape and size to different species. Research is still on going to help determine the role of sexual/species selection in dinosaur ecology. Ceratopsian horns and frills, as well as hadrosaurs, were not fully developed until they were adult. They might have used their frill and horns for dominance, defense, and display. Like living antelopes, chameleon, and deer, ceratopsians may have used their horns within their own species for territorialism and mating rights.	centrosaur, Chimaera, Utahceratops, Parasaurolophus, Gryposaurus	fleshed out images of the dinosaurs; photos of chameleons, male and female deer
PW4.E02.rc01		rail case	Hadrosaur and ceratopsian jaws and teeth				
	PW4.E02.ar01	artifact label	Label for hadrosaur material		Hadrosaurs had dental batteries, too, but with rows of replacement teeth under each exposed tooth. In some hadrosaurs, the individual teeth are so pressed together that they are like a giant file. Hadrosaurs chewed and ground up plant material. Fossilized stomach contents of hadrosaurs contain needles and branches of pine trees, the leaves of broad-leaved trees, and seed and fruits."	Gryposaurus l. dentary A1495 or Parasaurolophs maxillaA1496; isolated hadrosaur tooth w. root A1498	outline drawing w. bones shown
	PW4.E02.ar02	artifact label	Label for ceratopsian material		Ceratopsians (horned dinosaurs) have teeth with double roots, long narrow beaks and shearing teeth, plus powerful jaws. They were probably browsing on	ceratopsian dentary w. teeth A1497; isolated ceratopsian tooth A1499	outline drawing w. bones shown
PW4.E02.gr03		graphic rail					

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
PW4.E02.rc02		rail case	Rail case: hypsilophodontid and pachycephalosaur material			Hypsilophodontid: Two articulated feet, one articulated hand, and various other specimens; one to three pachy domes and other elements; ankylosaur scutes	
	PW4.E02.ar01	artifact label	Label for hypsilophodontid material		These two specimens represent most of the known material of the Kaiparowits hysilophodontid. Their hands were short and stubby suggesting that they did not use them very much. The foot is long and slender, demonstrating that they could run fast. (BG) Modified.	hypsilophodontid feet A1481a-b, hand A1482	outline drawing w. bones shown
	PW4.E02.ar02	artifact label	Label for pachycephalosaur material		Pachycephalosaur domes are the thick headed part of the skull that most often get preserved. We think that the pachy from the Kp is similar to *Stegoceras.* These are specimens of a skull dome from a pachycephalosaur. Scientists think that these domes were used to ram one another, although most paleontologists shy away from the idea of head to head combat. The back of pachycephalosaur skulls are ornamented with various bumps and spikes, depending on the species. These are specimens of bumpy ornamentation on the back of the pachycephalosaur species from the Kaiparowits. (BG) Modified.	pachycephalosaur domes A1484, 1483; skull fragment A1486; skull A1485	outline drawing w. bones shown
	PW4.E02.ar03	artifact label	Label for ankylosaurid		These are quadrapedal dinosaurs covered in bony armor as well as large spikes. They also have leaf showed teeth to help shred plant material. The bony scutes that are shown are the most common fossils found of these dinosaurs, because each individual would have had hundreds of these bony scutes embedded in their skin.	ankylosaur scutes	outline drawing w. bones shown
	PW4.E02.fp04	focus panel	Focus panel describes the hypsilophodontid, ankylosaur, and pachycephalosaur finds	There are small herbivorous dinosaurs in the Kaiparowits ecosystem. These dinosaurs are not as well known as the larger herbivore species.	Other fragmentary herbivores that are found in the Kaiparowits Formation are the pachycephalosaurs, the hypsilophodontids, and the ankylosaurs. Paleontologists at the UMNH are finding more remains every year to fill in the gaps of our knowledge. Hypsilophodontids are distantly related to hadrosaurs (duck-billed dinosaurs) and were fast runners. Their fossils are fragmentary from the Kp formation, although we have enough to name a new species. Pachycephalosaurs are related to ceratopsian (horned) dinosaurs. They walked on two legs and had leaf shaped teeth similar to the Hypsilophodontids. On top of their heads was a thickened skull, which is what their name is based on “thick headed lizard”. (BG) Ankylosaurs are large four-legged armored tanks. All of these dinosaurs had leaf shaped teeth for shredding plant material.		fleshed out hypsilophodontid, pachycephalosaur, ankylosaur
	PW4.E02.qt01	quote/question	Quote/question at base of Cretaceous platform		about diversity/sexual selection		
PW4.E03	**LC Tableau**		Visitors see a detailed recreation of the plants and some of the small animals that lived in GSENM about 75 million years ago.				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	PW4.E03.sx01	special exhibit	Cretaceous tableau		fallen log with mammals, snake and lizards; small dinosaur scavenging a ceratopsian carcass; empty dinosaur nest w. broke eggshell; stream with turtles, guitar fish, dead gar, dragonflies; ant nest near stream		
PW4.E03.gr01			graphic rail				
	PW4.E03.in01		Drawing interactive		Drawing activity		
	PW4.E03.ap01	activity prompt	Prompt for draw dinosaurs	Help us recontruct one of our new dinosaurs.	Pick one of the dinosaur skeletons, and draw what it might have looked like in life. Did it have feathers? Claws? What color was it? Paleontologists work with artists to recreate what dinosaurs looked like in life. Here's your chance to be a paleo-artist. When you're done, drop your picture in the slot and we'll add it to the dino art gallery.		skeletons of new finds dinos tbd.; photo of Scott working with John Moore
	PW4.E03.in02	interactive	Make a rubbing of dino skin				
	PW4.E03.ap02	activity prompt	Prompt for make a rubbing	Make a rubbing of dino skin	Make a rubbing of this piece of 75-million-year-old dino skin! Rub gently with your pencil, and the pattern of the skin will appear on the paper.	skin fossils tbd	
PW4.E03.gr02			graphic rail				
PW4.E03.id01		ID wheel	ID wheel describes ecosystem players, where they get their food				
PW4.E03.rc01		rail case	Case with eggshells, teeth			eggshell A1487a-j, theropod tooth A1457, tooth-marked bone A1458, tooth A1488, rib A1650, femur A1489	body outline w. bone
	PW4.E03.ar01	artifact label	Label for eggshell		A nest of broken dinosaur eggs - Eggshell is very abundant in the Kaiparowits Formation. We have not found a nesting site yet, only broken pieces of various styles and textures.	A1487	body outline w. bone
	PW4.E03.ar02	artifact label	Label for theropod teeth		Troodontid scavenging on a carcass -Theropod (carnivorous) dinosaurs and crocodiles and beetles scavenged on the dead animals within the Kp Formation. Paleontologists know this because they find pieces of fossil bone with tooth marks and feeding trails of beetles. Broken theropod teeth and crocodile teeth are found within the sites and within bones.	A1457	body outline w. bone
	PW4.E03.ar03	artifact label	Label for croc tooth, hypsilophodontid femur		This bone from a small herbivorous dinosaur (hypsilophodontid) was found with a crocodile tooth embedded inside. This is proof that a crocodile bit into the animal. We don't know if the crocodile hunted the hypsilophodontid, or just scavenged an already killed animal. (BG) This last bulleted text represents at least three fossils.	A1489	body outline w. bone
PW4.E03.rc02		rail case	Rail case with leaves, non-dinosaur animals			lizard jaws, mammal jaws, leaf fossils; mammals and reptiles to be selected	body outline w. bone

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	PW4.E03.ar01	artifact label	Label for ant nest		Ant nest(s) Ants also lived in lush swampy environment of southern Utah 75 Ma. Just like ants today, the ants that made this nest lived underground in tunnels and chambers. The nests were buried when a river levee broke, flooding the surrounding land.	ant nest A1454	body outline w. bone
	PW4.E03.ar02	artifact label	Label for plant material		Trees and shrubs with lush leaves were found in Utah 75 million years ago. Man of the plants found there are new to science with leaf patterns not seen today. There is still a lot to learn about the plants that supported this ecosytem.	leaves A1490, 1491, 1492, 1493; wood A1494	
	PW4.E03.ar03	artifact label	Label for mammal material		Mammals were not large-bodied during the Cretaceous, as they are today, but they were quite diverse in southern Utah, with at least 21 species present.	jaws A1652, 1653; teeth 1654, A1655	body outline w. bone
	PW4.E03.ar04	artifact label	Label for lizards and snakes		Lizards and snakes Lizards and snakes were also present in southern Utah 75 Ma. There are several lizards known including ones related to today's alligator lizard and komodo dragons (only much smaller). (BG)"	lizard jaws A1656, 1658, 1657	body outline w. bone
PW4.E03.gr03		graphic rail					
	PW4.E03.ms01	mindset	Mindset text describes the ecosystem and compares it to its modern analog, as well as to GSENM today; also outlines the trophic levels and players in the ecosystem.	The Kaiparowits ecosystem of 75 Ma worked like a modern ecosystem, but with different players.	Today Grand Staircase is dry, red rock country, but in the late Cretaceous, when a large seaway split the continent, it was part of "West America," a moist and humid environment like today's Mississippi delta. This area has been well-studied over the last 18 years, and many different dinosaurs, fish, turtles, small mammals, lizards, insects, and plants have been found. Even plants chewed by insects have been found, as well as ant nests.		foodweb diagram
PW4.E03.rc03		rail case	Rail case: stream dwellers			turtle shell pieces, gar scales, sturgeon material, Amia material	
	PW4.E03.ar01	artifact label	Label for turtles		There were lots of different organisms living in the aquatic environments including crocodiles, alligators, turtles, and fish. The types of animals living in streams and ponds during the Cretaceous have not changed much through today. However, new species have evolved and others went extinct. (as captions to the scene illustration) - Two turtles are lying in or near the water There are many different types of turtles in the Kp formation, probably because there was so much water. Most often, only pieces of turtle shell are found as evidence for these animals, but the UMNH has several complete turtles (See the large case nearby). The most common type of turtle in the formation was the soft-shell turtle. One of the rarer turtles was the mud turtle	kinosternid shell fragments A1455, 1456; trionychid shell fragments A1459, 1460	with diagram of scene

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	PW4.E03.ar02	artifact label	Label for fish		These gars obtained very large size (six to eight long) and were covered in lots of scales made of bone, unlike more typical fish scales. These gar scales are probably the most common vertebrate fossil from the Kp formation. Gars ate other fish, but also could have likely eaten small crocodiles and soft-shell turtles. These large gars are closely related to those found today in Louisiana Sturgeon and amiid fish in stream Other large fish lived in the streams with the gars	gar scales A1550; amiid vertebrae A1461, 1462, 1463a-c; sturgeon element A1651	body outline w. bone
PW4.E03.ca05		case	Case with Kaiparowits vertebrate and invertebrate diversity.			ankylosaur partial skeleton, Gryposaurus skull cast, Jelle tyrannosaur skull cast, tyrannosaur partial leg, Hagryphus hand, turtle shells, crocodilian material, clam bed section, dinosaur skin, baby hadrosaurid	
	PW4.E03.ms02	mindset panel	Mindset panel reviews Kaiparowits diversity.	These fossils reflect the diversity of organisms that have been found in the Kaiparowits formation.	The Kaiparowits Formation has only been actively searched for dinosaurs since the year 2000. Since then over 8 new species have been identified. The formation has also yielded an incredible number of other organisms such as mammals, lizards, turtles, and crocodiles. Other magnificent fossils include brand new plant species as well as dinosaur skin. (BG)		
	PW4.E03.gi01	graphic image	digsite photo, reconstructed scene with animals				
	PW4.E03.ar01	artifact label	Label for ankylosaur material		Armored dinosaurs are rare in the formation. The majority of fossils are of these pieces of armor called scutes. These protective bones were embedded in the skin of individuals to help prevent predation. Ankylosaurid dinosaurs come in two groups, those with large heavy tail clubs and those without. Both forms lived in southern Utah during this time. (BG)	ankylosaur scutes A1278	body outline with bones
	PW4.E03.ar02	artifact label	Label for Gryposaurus material		Duckbilled dinosaurs were the most common dinosaurs in southern Utah 75 Ma. This new species *Gryposaurus monumentensis* was one of the toughest with jaws more robust than most any other duckbilled dinosaur known. (BG)	Gryposaurus skull cast A1276	body outline with bones
	PW4.E03.ar03	artifact label	Label for tyrannosaur material		Tyrannosaur dinosaurs were the dominant predator of the Kaiparowits ecosystem. This specimen is the best skeleton found so far, but belongs to a juvenile tyrannosaur. Despite its young age, there is enough evidence to prove that it too is a new species. This femur, or thigh bone, from an adult tyrannosaur shows how much larger these predators can get. (BG)	fibula A1855, leg bones A1279, pubis A1845,ischium A1846, vertebrae A1847, 1848, 1849, 1850, 1851, 1853, 1854	body outline with bones
	PW4.E03.ar04	artifact label	Label for Hagryphus material		The first new dinosaur to be named from Grand staircase Escalante National Monument was this hand, *Hagryphus giganteus.* Paleontologists here at the museum used proportions of the hand to determine that it was a new species. (BG)	hand skeleton (cast)A1551	body outline with bones
	PW4.E03.ar08	artifact label	Label for Parasaurolophus		tk UMNH	skull A0113	body outline with bones

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	PW4.E03.ar15	artifact label	Label for ceratopsian skin material		Ceratopsian skin has recently been found on a new species of horned dinosaur. Its texture is different from that of hadrosaurs, looking more like large interconnected diamonds.		body outline with bones
	PW4.E03.ar16	artifact label	Label for the baby hadrosaurid.		This wonderful specimen is one of the most complete dinosaurs discovered to date in GSENM. It is a completely articulated baby (~1-2 yr old) duckbilled dinosaur (probably Gryposaurus). Interestingly, when the juvenile was buried in a river channel 75 Ma, an impression of the floppy decaying skin on its belly was preserved in the sediment.	A0378	body outline with bones
	PW4.E03.ar05	artifact label	Label for Kaiparowits turtles.		Turtles are the most common vertebrate fossils found in Kaiparowits Formation. There are many different kinds including soft-shell turtles, mud turtles, species related to snapping turtles, and even groups of turtles that are extinct today. Paleontologists have currently identified 9 species from the Kaiparowits Formation. (BG)		body outline with bones
	PW4.E03.ar06	artifact label	Label for softshell turtle material		Soft shell turtles are still alive today, and some of the species that we find in the Cretaceous are closely related to those found today in Louisiana. They are easily recognized by the pot-holed texture on their shell. (BG)	trionychid, Heloplanoplia sp. nov. A1468	body outline with bones
	PW4.E03.ar05	artifact label	Label for baenid turtle material		Baenid turtles are extinct today, but were very common in the Cretaceous. They is easily recognized by the large bumps on the shell. (BG)	Denazimys nodosa A1711	body outline with bones
	PW4.E03.ar07	artifact label	Label for Basilemys? turtle material		Basilemys praeclara? Is a turtle that lived its life like a tortoise, walking on the land. It had a very thick shell, characterized by the “sand dune-like” bumps. This turtle grew to large size, as demonstrated by the shell present, and also defended itself with armor inside its skin. (BG)	Basilemys praeclara A1466, 1568	body outline with bones
	PW4.E03.ar09	artifact label	Group label discusses Kaiparowits crocodilians.		Crocodilians were well represented in the Kaiparowits ecosystem. There were at least four kinds present at one time in the area ranging in adult size from three feet to over 35 feet long. Most of the crocodilians are more closely related to alligators than to true crocodiles.		body outline with bones
	PW4.E03.ar10	artifact label	Label for Brachychampsa material		Brachychampsa This crocodilian is small and ate mostly hard food such as turtles and small gar fish. Its back teeth are bulbous and rounded to help break through shells and scales.	specimen tbd	body outline with bones
	PW4.E03.ar11	artifact label	Label for Deinosuchus material		Deinosuchus This was the largest crocodilian in the Kaiparowits ecosystem. It could have eaten almost anything it wanted including dinosaurs. The upper jaw bone (maxilla) displayed shows how large the teeth would have been when alive. (BG)	maxilla A1467	body outline with bones
	PW4.E03.ar12	artifact label	Label for goniopholid material		This is a primitive kind of crocodile that grew to at least 30 ft long. Most of the remains thus far have come from these rectangular bony armor scutes from the back of the animal. (BG)	scutes A1710, 1715	body outline with bones

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	PW4.E03.ar13	artifact label	Label for clam bed material		Large beds of clams are known from the Kp Fm. These clam beds are important because they tell us that large populations of clams were living in the rivers of southern Utah 75 Ma. They also are important because it gives evidence of large storms that swept through the region, flooding rivers, and killing these clams. (BG)	specimen tbd	body outline with bones
	PW4.E03.ar14	artifact label	Label for hadrosaur skin material		The Kaiparowits Formation is becoming one of the best places in North America to study dinosaur skin. Around 20 dinosaur sites/in Kp have been located that contain skin impression. What is seen on the rock is not the real skin, but instead it is an impression of the skin in the sediment made right when the dinosaur died and fell into the river. (BG) Hadrosaur skin is the most common type found. It is made of small pebble-like scales most commonly, but also includes larger scales of different shapes. The different shaped scales may have been for ornamentation in a similar way that animals like giraffes have different patterns. (BG)	A1277a-c, 1464, 1465	body outline with bones
PW4.E04 Gryposauraus Underfloor Display and Activities wall							
	PW4.E04.sx01	special exhibit	Gryposaurus in floor case				
	PW4.E04.in02	interactive	Puzzle interactive; visitors unscramble the quarry map to match the floor				reference dwg.
	PW4.E04.ap01	activity prompt	Activity prompt for the Gryposaurus puzzle	Can you unscramble the pieces to match the dinosaur in the floor?	When paleontologists excavate a fossil site, an important step is to document where each fossil occurs. We've scrambled the map of the dinosaur behind you. Can you unscramble the pieces and fix the map?	Note: need to review interactive w. UMNH; reset is?	
	PW4.E04.ms01	mindset	Mindset panel describes the finding and excavating of the specimen and explains why soft tissue preservation is so informative; the preservation of skin (bacterial involvement) and patterns of the hadrosaur "scales."	Fossils are preserved in a variety of ways from articulated to disarticulated; fossils of soft parts like skin are amazing discoveries. Paleontologists use a grid to map fossil skeletons.	This Gryposaurus was discovered in 2001 and excavated over the next three years. The skeleton was found articulated (all together), encased in extremely hard sandstone that had to be removed with a rock saw. The site is located at the top of a three story hill in an area of GSENM called The Blues. A lot of the bones had to be helicoptered out because of their large size and the 3 mile hike into the site. Skin was revealed on several portions of the body, but most commonly associated with vertebrae. In fact, the entire tail is covered with skin. The total skin including patches throughout the body might approach, but this is a quick educated guess, 30 sq ft. During excavation, the skeleton was carefully mapped using a grid system so that it could be reconstructed just as you see it laid here.		
	PW4.E04.sx01	special exhibit	Touch hadrosaur skin		artifact ID	#a1277a-c or 1464, 1465	
	PW4.E04.ap02	activity prompt	Activity prompt for hadrosaur skin touch specimen				
PW4.E05 Ceratopsian Evolution			Visitors see a series of cast skulls illustrating trends in ceratopsian evolution, and learn about ceratopsian diversity, Cretaceous biogeography, and sexual selection.			Display of cast ceratopsian skulls is mounted according to an evolutionary tree of centrosaurs and chasmosaurs.	
PW4.E05.sx01			Ceratopsian skulls				
PW4.E05.gr01	graphic rail						

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	PW4.E05.ms01	mindset	Mindset text gives an overview of ceratopsian anatomy, and reviews the forces that drove ceratopsian evolution, with ceratopsian phylogeny graphic.	Ceratopsian dinosaurs used their horns and frills in display.	Every species of ceratopsian has different horns and frills. Ceratopsians evolved and diversified rapidly in North America in the Cretaceous due to a combination of environmental change and "malleable" display structures. In all ceratopsians, only the frills and horns changed significantly; the rest of the skeleton remained the same. This exhibit shows the two main lineages of ceratopsians: the chasmosaurs and the centrosaurs, each distinguished by varying sizes and shapes of their horns and head shields. Look at the family tree and figure out some of the differences. The vast majority of information in the text to the left is found on the ceratopsian display. Visitors can identify differences themselves, and the skulls are divided into two groups already, with labels.	reconstructed scene with animals	
	PW4.E05.gi01	graphic image	Maps w/captions				
	PW4.E05.gc01	graphic captions	Graphic captions explain Cretaceous biogeography using maps of North America, with ceratopsian distribution as a line of evidence	Climate and landscape shape the distribution of plants and animals.	During the Cretaceous, an inland sea split the continent several times. The Seaway was created as the Pacific and North American tectonic plates collided, causing the Rocky Mountains to form in western North America. With high global sea levels during the Cretaceous, waters from the Arctic Ocean in the north and the Gulf of Mexico in the south met and flooded the central lowlands, forming a sea that transgressed (grew) and regressed (receded) over the course of the Cretaceous. The seaway split the continent into "East America" and "West America" - the ceratopsians shown here lived in the narrow slice of continent that was "West America". BG-what about the ceratopsian tooth from Maryland?-I don't know about that tooth. But it is reasonable to assume that ceratopsians lived across NA.		
PW4.E05.gr02 Ceratopsians		graphic rail					
	PW4.E05.fp01	focus panel	Chasmosaurs	Chasmosaurs have long brow horns and long frills.	Chasmosaurs have longer brow horns than nose horns, and a very long frill often with large holes in it. Their snouts are longer and shallower than those of centrosaurs. Chasmosaurs didn't have frill spines, but small triangle-shaped bones at the edge of the frill. They are larger than centrosaurs, as a rule. You might know Triceratops, one of the last chasmosaurs. Chasmosaurs have been found in Alberta, Montana, Utah, New Mexico, and northern Mexico.		
	PW4.E05.fp02	focus panel	Centrosaurs	Centrosaurs have short brow horns and frills, the rest of their skeletons look a lot like those of Chasmosaurs.	Centrosaurs have small brow horns and long nose horns, and short frills often with spikes. There are variations - Achelousaurus and Pachyrhinosaurus don't have nose horns as adults; they have knobby bones covering their noses instead. Centrosaurs have been found in Alaska, Southern Alberta, Montana, and Utah.		
	PW4.E05.ar01	artifact label	Label for Protoceratops			Protoceratops cast skull A0200	body outline
	PW4.E05.ar02	artifact label	Label for Zuniceratops			Zuniceratops cast skull A0847	body outline
	PW4.E05.ar03	artifact label	Label for Diabloceratops			Diabloceratops cast skull A0121	body outline
	PW4.E05.ar04	artifact label	Label for Eric ceratopsian			Eric ceratopsian cast skull A0399	body outline
	PW4.E05.ar05	artifact label	Label for Centrosaurus			Centrosaurus cast skull A0204	body outline
	PW4.E05.ar06	artifact label	Label for Styracosaurus			Styracosaurus cast skull A0205	body outline
	PW4.E05.ar07	artifact label	Label for Einiosaurus			Einiosaurus cast skull A0202	body outline
	PW4.E05.ar08	artifact label	Label for Achelousaurus			Achelousaurus cast skull A0203	body outline

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	PW4.E05.ar09	artifact label	Label for Pachyrhinosaurus			Pachyrhinosaurus cast skull A0201	body outline
	PW4.E05.ar10	artifact label	Label for Chasmosaurus			Chasmosaurus cast skull A0209	body outline
	PW4.E05.ar11	artifact label	Label for Pentaceratops			Pentaceratops cast skull A0198	body outline
	PW4.E05.ar12	artifact label	Label for Utahaceratops/chimeraceratops		need to resolve ceratopsian skull series!	Utahaceratops/chimeraceratops cast skull Two different ceratopsians A0905	body outline
	PW4.E05.ar13	artifact label	Label for Anchiceratops			Anchiceratops cast skull	body outline
	PW4.E05.ar14	artifact label	Label for Torosaurus			Torosaurus cast skull A0882	body outline
	PW4.E05.ar15	artifact label	Label for Triceratops			Triceratops cast skull A0208	body outline
	PW4.E05.sp01	story panel	Scott Sampson discusses his work on ceratopsians; what drew him to the group; how cool they are				photo of Scott in the field or office
PW4.E06 Therizinosaurs/ Early Cretaceous			Visitors see skeletons of 2 meat-eaters that turned to herbivory. They can look at fossils from the Cedar Mountain Formation in a nearby case, and learn about the importance of that age to dinosaur studies.			Cast mounts of Falcarius and Nothronychus	
PW4.E06.gr01		graphic rail					
	PW4.E06.ms01	mindset	Mindset text describes how meat-eating dinosaurs evolve into herbivores and outlines implications for body size	Some kinds of meat-eating dinosaurs evolved into plant-eaters.	These dinosaurs are transitional forms - dinosaurs from the raptor lineage that became plant-eaters. They are therizinosaurs; two of the three definitive North American therizinosaurs fossils are from Utah. (BG) Paleontologists are not sure if the group originated in Asia or North America; the oldest therizinosaurs are found from about the same time on both continents. Falcarius is the most primitive known therizinosaur and shows the most raptor features. Nothronychus was first found in New Mexico in the late 1990s. It, like later therizinosaurs, is bigger than Falcarius. These bigger plant eaters had shorter tails and large guts; they balanced on their hind legs and grabbed branches with their arms. Therizinosaurs, like all other heavily herbivorous dinosaurs, attained large body size probably because of the physical requirements of processing plant material. Their guts/belly became larger, along with their bodies. Falcarius is still in the early stages of the herbivorous transition and has a much smaller body than the more derived therizinosaurs. Its body is closer to a carnivorous raptor's.		reconstructed scene with animals
	PW4.E06.fp01	focus panel	Focus panel text points out transitional features on the specimens so visitors can "see evolution in action."	Look closely and you can see the transitional features of these dinosaurs.	Falcarius is about 13' long, with sharp claws - yet scientists think it ate plants as well as meat. Look at its teeth- they look like little leaves, not like curved blades. Leaf-shaped teeth are found in other plant-eating dinosaurs and are good for shredding plants. Can you find the dinosaur's hips? Plant eaters need bigger digestive systems than meat-eaters since plants are harder to digest. Falcarius' pelvis is expanded sideways to accommodate a larger gut. Look at Nothronychus' claws - the dinosaur is named for them (sloth-like claw), because they look like the claws of giant ground sloths. Nothronychus probably used its claws to pull down branches, as giant ground sloth did.		map of North America showing location of therezinosaur finds; Falcarius skull; Nothronychus skull; Falcarius pelvis; fleshed-out dinos
PW4.E06.gr02		graphic rail					

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
PW4.E06.fl01		family label	family label, humans as omnivores vs. Falcarius and Nothronychus	What do your favorite food? If you were one of these dinosaurs, it would be green plants.	These dinosaurs have 3 fingers with long claws, like their raptor relatives, but they were pulling down plants, not catching prey. These dinosaurs evolved from meat-eaters, but are becoming vegetarians.		illustration of child, Falcarius, Nothronychus, raptor dinosaur
	PW4.E06.ar01	artifact label	Label for Falcarius			Falcarius mount A0123	
	PW4.E06.ar02	artifact label	Label for Nothronychus			Nothronychus mount A0124	
PW4.E06.ca04		case- Cedar Mountain Formation	Case holds fossils from the Cedar Mountain Formation, including a primitive mammals skull, unnamed ankylosaurid/nodosaurid, theropod fossils, Falcarius fossils, sauropod fossils, iguanodontian fossils, crocodilian fossils.			sauropod limbs, iguanodontian skull and dentaries, ilium; ankylosaurid femur;	
	PW4.E06.ms02	mindset	Mindset text describes the importance of the early Cretaceous to dinosaur studies, and outlines the importance of Cedar Mountain Formation.	The animals in this case are transitional between the Late Jurassic and the Late Cretaceous.	This time period (124-114 Ma) is becoming one of the most important in the North American dinosaur record. These fossils come from the Cedar Mountain Formation in Utah. The Early Cretaceous of North America contained animals that were a mix of those found earlier in the Jurassic and then later in the Cretaceous. All of these fossils come from the Cedar Mountain Formation (~124 Ma- 95 Ma), the most productive (fossiliferous) group of sediments from this time in North America. The fauna includes sauropods (long-necked dinosaurs), iguanodontians (the ancestors to the hadrosaurs), ankylosaurs, and primitive raptor dinosaurs. (BG)	photo of site being worked, reconstructed scene with animals	
	PW4.E06.ct01	case title	Title and subhead	The Cedar Mountain Formation is one of the few rock formations in North America from the early Cretaceous.	Cedar Mountain Fossils Early Cretaceous, 127 to 98 million years ago Cedar Mountain, discovered in 1944, was thought to lack dinosaurs. In the 1990s, dinosaurs were discovered, including the therezinosaur Falcarius, ankylosaurs, and sauropods.		
	PW4.E06.ar01	artifact label	Label for sauropod material		After the Jurassic, long-necked dinosaurs began to decline in diversity; of the three groups that existed in the Morrison Formation, only two survived into the Early Cretaceous. At the end of the Cedar Mountain Formation, the sauropods disappeared from North America. (BG)	sauropod femur A1240	body outline with bone
	PW4.E06.ar02	artifact label	Label for iguanodontian material		Within the Late Jurassic CLDQ, the primitive Camptosaurus is found. During the Early Cretaceous we find iguanodontians that have evolved closer to hadrosaurs. Their jaws have increased the number of teeth, faces elongated, and they have become much larger. They process plant food better. (BG) Juvenile dentary Teeth became more numerous in the mouths of iguanodontians. This helped them to process food. - Juvenile skull the skulls look similar to those of other iguanodontians found in South Dakota. However, these fossils are still being studied to figure out if they are a new species. - Large ilium: these iguanodontians grew to very Large, as evidenced by This Large ilium, or hip bone.	iguanodontian dentaries A1242m 1236, juvenile skull A1238, ilium A1239	body outline with bone
	PW4.E06.ar03	artifact label	Label for ankylosaurid material		These animals that were around during the Jurassic do not make much of a change in appearance. However, one of the largest armored dinosaurs ever discovered lived in Utah, 124 Ma.	Ankylosaur femur A1241 + other material to be added in 2009	body outline with bone

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	PW4.E06.ar04	artifact label	Label for theropod material		The herbivores did not live alone. This time for theropods is incredibly important because it is the end of the group of dinosaurs closely related to Allosaurus from the Jurassic, the beginning of the tyrannosaurs, and the start of the great diversification of the raptor dinosaurs. (BG) Large theropod All that we have now are teeth of a large carnivorous dinosaur. This animal will be very important in determining the pattern of extinction and evolution of large theropods. Undescribed raptor These vertebrae are the first clues to the identity of one of the earliest raptor dinosaurs. It is closely related to a raptor from Wyoming called Deinonychus. Falcarius utahensis This raptor dinosaur changed its habits from a meat eater, to eating plants. This is the earliest stage discovered of the transition. Luckily, hundreds of Falcarius individuals are known ranging in size from baby to nearly adult, though no full adult has yet been found. (BG)	theropod tbd, raptor vertebrae, Falcarius tbd A1025	body outline with bone
	PW4.E06.gi01	graphic image	map showing quarry location; photos of quarry				
	PW4.E06.gc01	graphic caption	Graphic captions describe the Crystal Geyser quarry.		Largest concentration of a raptor dinosaur in the world. Possibly Hundreds of individuals rest there. Scientists do not know exactly what happened there, but possibilities range from drought to poisoning by a spring. (BG)		body outline with bone
	PW4.E06.ar05	artifact label	Label for crocodile		The crocodile seen here is a primitive form that is transitioning to the more familiar types of crocodiles we see in the Late Cretaceous. (BG)	croc skull and armor A1237	body outline with bone
	PW4.E06.ar06	artifact label	Label for cynodont		This very primitive mammal is from a group of the first mammals to evolve. It is one of the best preserved mammal skulls of this type in the world. Its presence in the Cedar Mountain Formation shows that the group had not been outcompeted by other mammals. This is another example of how important the transitional faunas of the formation is.	cynodont material tbd	body outline with bone
PW4.E07	**New Finds**		Visitors see the latest finds and learn about the museum's ongoing research programs.				
PW4.E07.gr01		graphic rail					
	PW4.E07.sp01	story	Story: Bucky, Lindsay or other UMNH paleontologist discusses new finds; what it's like to find dinos new to science				
	PW4.E07.fp03	focus panel	Focus panel describes the new dinosaur species, includes map of Utah w. GSENM highlighted and fleshed-out image	GSENM is "the last major dinosaur graveyard to be explored;" This quote is so not true. It should not be included. UMNH researchers have recently described several new kinds of dinosaurs.	UMNH scientists described a new kind of plant-eating dinosaur named Gryposaurus monumentensis (the name means "hook-beaked lizard" and monumentensis is for GSENM, where it was found. The dinosaur was a very large duck-billed dinosaur; it's the largest dinosaur known from the Kaiparowits ecosystem. It had very large jaws and hundreds of teeth. Researchers from the Alf school found the skull and showed it to UMNH scientists, who went searching for the rest of the skeleton. The head might have rolled into a bend of a river, where it was partially buried. Because the right side of the skull was exposed, some bones floated away.		site photos, photos of UMNH crews at work

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special exhibit changeable framework	PW4.E07.ms01	mindset	Mindset text in bulletin board style shows field photos, newspaper reports, and images from papers describing new finds.	UMNH staff and students are currently researching the Kaiparowits ecosystem, and finding new kinds of dinosaurs and other animals.	Pending new find, Having scientific papers on display may be a neat thing. There are certainly a number to choose from now. The hypsilophodontid paper should come out next year, along with the ceratopsian descriptions. Note: RAA to provide graphic format for UMNH to produce labels		
	PW4.E07.ar01	artifact label	Temporary artifact labels for specimens				
PW4.E08 Dino Dig			Visitors use tools and their hands to uncover cast fossils of Kaiparowits specimens. They can also map the "quarry" and don dino masks and tails to battle it out in the dino arena.				
	PW4.E08.sx01	special exhibit	Interactive dino dig: visitors scrape away a matrix of sand, sawdust, paraffin to reveal casts of fossils from the Cretaceous of Utah; adjacent tool chests store brushes and other tools		specimens tbd UMNH		illustrations of the bones in the pit and the animals they come from (skeleton and fleshed out)
PW4.E08.gr01		graphic rail					
	PW4.E08.ap01	activity prompt	activity prompt for dino dig	You can be a paleontologist - use your eyes and hands to discover fossils from Utah's Kaiparowits Formation.			photo of paleo crew at work in the field
PW4.E09 Late Cretaceous			Visitors view a case of fossils from the North Horn Formation, and read about the fossils and about dinosaur extinctions.				
	PW4.E09.ca01	case	Case with fossils from the North Horn Formation			T. rex tooth, Alamosaurus vertebrae, Torosaurus frill, hadrosaur humerus and tooth, ankylosaur scute, crocodile vertebrae, crocodile jaws and teeth, turtle shell	
	PW4.E09.ct01	case title	Title and subhead	The North Horn formation is one of few formations that span the Age of Dinosaurs into the Age of Mammals.	North Horn Formation Fossils 70 to 55 million years ago. The end of the Age of Dinosaurs		
	PW4.E09.ms01	mindset	Mindset text discusses the environment and significance of the North Horn Formation	Utah's North Horn Formation spans the end of the dinosaurs and the beginnings of the Age of Mammals.	During the time when the Kaiparowits Formation was laid down, Utah was near an ocean, and the environment of southern Utah was a lush, wet plain. However, by the end of the Cretaceous, mountains were rising in Utah creating a different environment for the organisms that lived here. The North Horn Formation records a large ancient mountain valley where rivers washed into the valley floor, then out of the mountain system. The composition of the North Horn fauna was similar to that of earlier in the Cretaceous of southern Utah, but only in that the types of animals were the same. There were still crocodiles, turtles, mammals, lizards, and several types of dinosaurs. However, the species changed over time, retaining the same roles as their predecessors. (BG)		timeline graphic; map of Utah showing location of North Horn outcrop; photomural of quarry ; map of Utah in the Cretaceous; reconstructed scene with animals
	PW4.E09.ar01	artifact label	Label for T. rex material		T-rex skull and skeleton This is the first T-rex from Utah. It is nick named “Big Blue” because of the bluish color of the bones. There are several bones from the skull and skeletal elements. (BG) Association of T-rex and Alamosaurus Utah is the only place in the world where T-rex and a long necked dinosaur (sauropod) are found together in the same formation. This is important because in all likelihood T-rex fed on the Alamosaurus, thereby adding another victim to the T-rex feeding list. (BG)	T. rex tooth A1451; skull cast A1271; vertebrae A1272, 1273; post-orbital and squamosal A1274; tibia A1275	body outline with bone

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	PW4.E09.ar02	artifact label	Label for Alamosaurus material		Return of the giants During the Late Jurassic and the Early Cretaceous giant long necked dinosaurs roamed over Utah. They were one of the most common forms of dinosaurs. Then, they disappeared around 100 Ma. In the Latest Cretaceous long necked dinosaurs, such as Alamosaurus, came back to North America after dispersing from South America. (BG) This is a long neck dinosaur related to Jurassic forms such as Brachiosaurus. It lived not only here in Utah but also in New Mexico and Texas. (BG)	Alamosaurus vertebra A1448	body outline with bone
	PW4.E09.ar03	artifact label	Label for Torosaurus material		The only horned dinosaur known from the North Horn Formation is Torosaurus utahensis. It is closely related to Triceratops but quite distinct because of the large holes in its head shield, or frill. The large frill on this dinosaur gave it the distinction of having the largest skull of any land dwelling animal, ever. (BG)	Torosaurus frill A1453	body outline with bone
	PW4.E09.ar04	artifact label	Label for hadrosaurid material		Duck-billed dinosaurs are not known very well from Utah during this time. We only have scrappy remains of these dinosaurs, including this partial upper arm bone and tooth. (BG)	hadrosaurid tooth A1452 and humerus A1443, 1444	body outline with bone
	PW4.E09.ar05	artifact label	Label for ankylosaur material		The only evidence that we have of armored dinosaurs is a single scute, or piece of armor. However, this is evidence they were around. (BG)	ankylosaur scutes A1447	body outline with bone
	PW4.E09.ar06	artifact label	Label for crocodile material		Just like earlier in the Cretaceous, crocodiles played an important role in the ecosystem. (BG)	croc vertebrae A1449, 1450, jaws w. teeth A1446	body outline with bone
	PW4.E09.ar07	artifact label	Label for turtle material		Turtles were also around at this time. This is a piece from a soft-shelled turtle. (BG)	A1445	body outline with bone
	PW4.E09.gi01	graphic image	photo of outcrop w. boundary; various extinction scenarios				
	PW4.E09.gc01	graphic captions	Graphic captions discuss dinosaur extinctions, and the K/T boundayr at North Horn.		The North Horn Formation was laid down at the end of the Cretaceous and on into the Neogene Period, this is the time after most dinosaurs went extinct. In many places around the world a coal or a special clay layers marks the boundary for the end of the Cretaceous, but here in the North Horn, the boundary lies somewhere in the middle of this sediment body (picture showing approximate boundary). Scientists have not been able to pinpoint the K/T extinction line yet. All we know is that below this sandstone nonavian dinosaur eggshells are found, and above it, they disappear. (BG) What caused the extinction of the dinosaurs? At the end of the Cretaceous, a mass extinction (at least 75% of all living species die off) occurred.		photo of outcrop w. boundary; various extinction scenarios?

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
					Not just dinosaurs died - flying reptiles and marine reptiles went extinct, and other marine animals, marine mollusks, and land plants were hard hit. Scientists have proposed a number of ideas, including meteorite impact, and large-scale volcano activity, We may never know the answer to what killed the dinosaurs - the fossil record is an incomplete recording of past events and life, and it's hard to explain selective extinctions (mammals and non-dinosaur reptiles seemed to survive whatever the event was).		body outline with bone
PW5 Late Jurassic							
	PW5.E01.pm01	photomural	Artist's mural		caption for mural: San Rafael Swell, 147 million years ago		
	PW5.si01	section intro			Now we've traveled back to 147 million years ago, to central Utah. This slice of time portrays the Cleveland-Lloyd Dinosaur Quarry, near Cleveland, Utah in the San Rafael Swell. The Quarry, which dates to approximately 147 million years ago, is the site of a massive dinosaur graveyard. It has produced at least 9 different dinosaur species, from plant eaters to meat eaters. More scientific studies have been performed on this fossil locality, in an attempt to determine how the dinosaurs died, than on any other site in the world. And yet the mystery is still UNSOLVED. Here you'll see the fossil evidence, and draw your own conclusions about this Jurassic murder mystery.		timeline graphic, map
	PW5.E01.qt01	quote/question	Quote/question on west wall				
PW5.E01 Predators or Scavengers (Stegosaurus, Marshosaurus, Ceratosaurus)			Visitors see 2 meat-eaters circling a Stegosaurus carcass and can decide for themselves whether they are seeing scavengers or predators at work. A smaller carnivore lurks, waiting for an opportunity to grab its share.	The Cleveland Lloyd quarry is a massive dinosaur graveyard; although well-studied, it's still a mystery.			
PW5.E01.gr01		graphic rail					

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	PW5.E01.ms01	mindset	Mindset text describes the environment of the Cleveland-Lloyd Quarry		The CLDQ was deposited in a flood plain pond. We don't know if there was vegetation around, because the only plant remains within the quarry are tiny pieces that might have washed in with water. The area surrounding the quarry is dotted with evidence of permanent lakes, but there is evidence that the pond with the fossil deposit was ephemeral, it dried up occasionally, or alternatively, it filled up occasionally. The climate would have followed that of the Morrison generally. (BG) Within Utah, the Morrison Formation — the stack of sediments that holds all of the fossils seen in this exhibit -— was deposited under a semi-arid, highly seasonal climate, with extensive floodplains, lakes and rivers. Vegetation likely thrived near the water sources, yet may have dwindled further away. There were also massive volcanoes to the west that periodically deposited volcanic ash over this area of Utah. (BG) The mystery about Cleveland-Lloyd is how so many allosaurs came to be deposited here. We don't know why. Cleveland-Lloyd represents a snapshot of the world that we don't know about. It was arid, but productive vegetation grew along the rivers. There were large rivers, but no flowers. Flowers didn't appear until after the dinosaurs were extinct. The trees were large conifers and there is some debate as to where the vegetation was. Why were there so many large animals here? The allosaurs were carnivores along with the plant eaters Brontosauraus and Camarasauraus. They were deposited in the Morrison formation. We haven't solved these mysteries. (SS)"		reconstructed scene with animals
	PW5.E01.fp01	focus panel	Focus panel text explains the diversity of meat-eaters found at Cleveland-Lloyd, and gives visitors clues to help assess their feeding strategies.	The diverse meat-eating dinosaurs of the Cleveland-Lloyd quarry used different feeding strategies (hunting vs. scavenging).	Here you see two large meateaters circling a Stegosaurus while a small predator lurks, hoping to grab a bite. We don't know if these animals were predators or scavengers, but it's unlikely they would have passed up an available carcass. Theropods, or meat-eating dinosaurs, ranged from chicken-sized animals to the giant T. rex. It's unlikely that all theropods used the same feeding and hunting strategies. Carnivores acquire food by killing another animal or by eating one that is already dead. Predators--carnivores that chase and kill their prey--are usually fast and agile. They have adaptations for rapid movement and often have good eyesight. Scavengers--carnivores that feed on dead animals--often have a good sense of smell that is useful for finding dead animals. Scavengers do not need to run as fast as predators. It is probable that some theropods were predators, some were scavengers, and others may have been both predator and scavenger.		foodweb graphic
PW5.E01.id01		id label	Who's who illustration/label				
	PW5.E01.sx01		Cast mounts of Marshosaurus, Coelurus and Ceratosaurus with a partial skeleton of Stegosaurus, Archaeopteryx above			Marshosaurus A0110, Stegosaurus, Coelurus A0902, Ceratosaurus A0106, Barosaurus, Allosaurus, Archaeopteryx A0825 above	
PW5.E02 Did Dinos Hunt in Packs? (Allosaurus and Barosaurus)			Visitors can walk all the way around a dramatic mount showing a pack of adult and juvenile Allosaurus attacking a Barosaurus.			cast skeletons of Barosaurus A0905 and Allosaurus A0107, 0901, 0109, 0401, 0402, 0403	

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
PW5.E02.gr01		graphic rail					
	PW5.E02.fp01	focus panel	Focus panel text outlines the evidence for pack hunting and bullying and invites visitors to form their own conclusions	There is evidence that some dinosaurs hunted in packs.	Allosaurus may have hunted in packs. They lived with some of the largest dinosaurs ever - large sauropods like Barosaurus and Camarasaurus, and armored Stegosaurus. Could one Allosaurus have killed one of these large animals? These theropods may also have relied on numbers to bring down the large sauropods and armed stegosaurs, much like a pack of wolves or African wild dogs do. Possible fossil evidence for allosaur pack hunting can be found at Cleveland Dinosaur Quarry. Here vast numbers of allosaurs of all different ages were caught in a dinosaur graveyard. Along with them were bones of sauropods and stegosaurs, and the smaller camptosaurs. However, the allosaur bones are the most common fossil in the deposit. According to some paleontologist this is indeed good evidence for pack hunting for allosaurs. For others, the fact that so many allosaurs are present in the quarry does not mean that they pack hunted, simply that the allosaurs died in the same spot. Modified. Similar fossil beds containing "packs" of carnivorous dinosaurs have been found in Alberta, and studied by Phil Currie, a theropod expert from the Royal Tyrell Museum in Alberta. Has recently found a large bonebed containing what he thinks is a "pack" of tyrannosaurs known as Albertosaurus. Adult and juvenile Allosaurus may have pursued different hunting strategies, with juveniles chasing small prey and adults working together to bring down larger prey.		
	PW5.E02.fp02	focus panel	Focus panel asks why are there so many allosaurs at Cleveland-Lloyd.	Allosaurus is the most common dinosaur at CLDQ - it's unusual for a predatory dinosaur to dominate.	Allosaurus is not just the most numerous predator at Cleveland Lloyd, it's the most numerous dinosaur! More than 12,000 bones have been excavated from the quarry since 1927, and about two-thirds are Allosaurus bones. The usual ration of predators to plant-eaters is 1:10. What's happening at Cleveland Lloyd? The allosaurs from this quarry include all ages. There were animals from only a little over three feet in length to those more than 25 feet long and weighing more than two tons.		
PW5.E02.gr02		graphic rail	Allosaurus Foot				
	PW5.E02.in01	interactive	Visitors assemble an Allosaurus foot puzzle next to a display of disarticulated bones; rail is located in front of foot of adult Allosaurus skeleton.			Allosaurus foot (cased) A1718	diagram of foot w. labeled bones
	PW5.E02.ap01	activity prompt	activity prompt for Allosaurus foot activity				
PW5.E02.gr03		graphic rail	Barosaurus Biology				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	PW5.E02.fp03	focus panel	Focus panel describes Barosaurus and what we know of sauropod biology.	Sauropods are very large, long-necked plant eating dinosaurs. They are the largest land animals ever.	Because they were so tall, sauropods could feed in the tallest trees, out of reach of smaller plant-eating dinosaurs. Their long necks had more bones than other dinosaurs (12 to 17 vs. 9 or 10) and these bones were light, with hollowed out chambers. Sauropods such as Barosaurus and its kin had long, whip like tails. Did they use these in defense? Some paleontologists think so, others think they might have cracked their tails to signal other sauropods, or to scare attackers with the loud noise. Barosaurus is closely related to Diplodocus and Apatosaurus. Like them it had long, pencil-shaped front teeth.	Barosaurus skeleton	
					It is very difficult to know for sure if a fossil animal was predated upon or simply scavenged. Therefore, it is hard to know if a fossil adult sauropod was killed or died of other causes and then eaten. Lots of adult sauropod bones have bite marks, indicating it was eaten by carnivores. The only way to know if an animal was attacked by a predator is to have the animal live, the wound partially heal, and a piece of tooth still in the wound. This strict and rare evidence is scientifically necessary to say that predation was likely. Given the large size of adult sauropods, it is unlikely that they would have been attacked, but it is uncertain."		
	PW5.E02.gc04	graphic caption	Graphic captions describe Cleveland-Lloyd herbivores and ask why so few?		Plant-eating dinosaurs found at the quarry include Stegosaurus, Camarasaurus, Barosaurus and Camptosaurus. There are not that many plant-eaters compared to the total number of dinos. Some scientists think that they were staying around a watering hole during a drought. They stayed until they died from something (dehydration, starvation, murder, etc). Their bones are found concentrated in the bottom of the quarry layer, but also dispersed throughout in lesser concentrations.		images of fleshed out dinos; graphs/charts of # of herbivores in comparable formations
PW5.E03 Solve the Mystery of the Quarry			Visitors see fossil and geologic evidence - clues to the mystery of the quarry and decide which of the 4 scenarios the clues support.				
	PW5.E03.qt01	quote/question	Quote/question on east wall about Cleveland-Lloyd or fossil mysteries				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	PW5.E03.ms01	mindset	Mindset text outlines the mystery and introduces scenarios and invites visitors to solve the mystery; with quarry map.	Although the Cleveland-Lloyd quarry is one of the most-studied localities, scientists aren't sure why it's a massive dinosaur graveyard. Which scenario makes sense to you?	Lots of dinosaurs died at the quarry, and, although many scientists have studied the quarry, we still don't have a definitive answer to the mystery of the quarry. The four scenarios are: volcanic ash, flood, drought, and predator trap. If a large volcanic eruption happened, animals are buried rapidly as they were in life (think of Pompeii). Their skeletons aren't disarticulated as they are at the quarry. A predator trap is often a swamp in which prey animals become stuck, and attract predators. The large proportion of predators at the quarry supports this hypothesis. At predator traps, the bones are often preserved upright, which we don't see at the quarry. When there is a drought, animals tend to gather at scarce watering holes. The quarry might represent a watering hole, where you would find predators and prey together in search of water. The evidence for a drought at the quarry includes a progressive rate of burial, as some animals died, others fed on and/or trample their carcasses. A flood might have buried the dinosaurs all at once.		scenarios paintings
	PW5.E03.av01	av-Paleontologists	Voices of paleontologists discussing their theories of the CLQ mystery.	Decide for yourself which scenario best explains the Cleveland Lloyd Quarry.	Visitors watch as a group of paleontologists discuss how the Cleveland-Lloyd Quarry formed - was it drought, predator trap, volcanic ash, or flood? There is evidence for all 4 scenarios from the condition, number and type of fossils, from the geology of the quarry, and from changes to the bones after death. Each scientist points to particular rocks or fossils that support the scenario they espouse, and refers to the painted reconstructions of each scenario. These items are found in adjacent case and graphics, so visitors can refer to them as they walk down the ramp and view the evidence from the quarry. The video draws visitors into a scientific debate, and leaves them with the sense that science is a process of ongoing inquiry, not a closed book.	4 voices at 3 min. each	
	PW5.E03.gi01-gi04	graphic image	reconstructions of scenarios				
	PW5.E03.fp01	focus panel	Focus panel text reviews the 4 scenarios.	The clues give hints, but not definitive answers. Use your judgment and evaluate the scenarios. We need to discuss this set up since visitors will come from either the top or bottom. This could be included with the talk-back interactive as a review before they made their selection.	Clue Volcanic ash Flood Drought Predator trap Are the bones articulated? Yes Yes No Maybe Are there are a high number of predators? Maybe Maybe Maybe Yes Is this quarry in a lake or a river? Lake River Lake Lake Are there tooth-marked bones? No No Yes Maybe Are there broken and crushed bones? Maybe Maybe Yes Maybe Are there mostly young animals? Maybe Maybe Yes Maybe Are there bone pebbles? No Yes No No Is there bone rotting? No No Maybe Maybe		
	PW5.E03.in01	interactive-penny drop	Visitors drop a coin into the tube under their favorite scenarios.				
	PW5.E03.ap01	activity prompt	Prompt for penny drop	Cast your vote - which scenario makes sense to you?	Vote by putting a penny in the tube under your favorite scenario. How does it stack up to the other scenarios? Query for UMNH - do we have to say where the money goes?		

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	PW5.E03.ca06	case- CLDQ	Cleveland-Lloyd collection case holds fossils from the quarry related to taphonomy, dinosaur diversity, and sediments.				
	PW5.E03.fp02	focus panel	Focus panel text explains taphonomy and describes the taphonomic features found at CLDQ.	This case is filled with clues (fossil and geologic evidence) to the mystery of the quarry.	This case is filled with objects that give clues to the Cleveland Lloyd Dinosaur Quarry mystery. These are the same clues that paleontologists use during studies of the quarry. Paleontologists look at the various clues, including numbers of dead dinosaurs, types of dinosaurs, condition of bones, etc. Scientists compare modern conditions of dead animals in different death scenarios to understand the patterns that develop from them. This is called taphonomy. Taphonomy is the study of all events associated with an organism from the time of death until a paleontologist excavates it. Other lines of evidence include the sediments of Cleveland Lloyd, the diversity and percentages of dinosaurs, and what we don't find at the quarry. (BG)		
	PW5.E03.ar12	artifact label	Label text discusses tooth marked bone.		Gauges in bone usually mean that the tooth of a carnivorous animal scraped along the bone during feeding. Paleontologists use this information to show that the carcass was eaten. We don't know if the carnivorous animal that left the tooth mark killed the prey or is scavenging the last bit of meat from a bone. Only a few of the bones found at CLDQ have tooth marks, Could it be from an abundance of meat for carnivores to eat or from the animals being buried a short time after death? (BG) This is a metatarsal (foot bone) from the long-necked herbivorous dinosaur Camarasaurus. The deep grooves on the bone were made from a carnivorous dinosaur scraping its teeth on the bone to obtain all the meat possible. This is a vertebra from an Allosaurus. Was the animal that left this tooth mark a cannibal or another species of carnivore?	Camarasaurus metatarsal A1065, Allosaurus vertebrae A0891, 1064	body outline w. bone
	PW5.E03.ar13	artifact label	Label text discusses broken bones.		Paleontologists find two types of broken bones, those bones broke before fossilization and those broken after. Bones broken after becoming a fossil tend to break at nearly 90 degree angles. Bones broken before fossilization form different angles with artifact labels Again separate these out. Allosaurus ilium #12101 This Allosaurus ilium is missing its entire upper blade. Allosaurus ilium #8240 This Allosaurus ilium is complete, showing how much of the other bone is missing. Allosaurus ribs This is a broken rib and this is an unbroken rib. bone fragment Some bones are broken so much that we cannot recognize them, such as this piece. (BG)	Allosaurus ilia, broken rib, unbroken rib, bone fragment There may be another large example to be included. A1712, 1714, ilium A0874?	body outline w. bone

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	PW5.E03.ar14	artifact label	Label text discusses crushed bones.		If the ground is hard, a bone may crush when stepped upon. These two bones were found next to one another, both crushed in the middle. It is likely based on proximity within the quarry and relative size that these belong to the same Allosaurus. With artifact labels This is a crushed femur (upper leg bone). This crushed tibia (lower leg bone) was found right next the femur, and maybe from the same animal. (BG)	Allosaurus femur A0889, Allosaurus ilium A0888	body outline w. bone
	PW5.E03.ar15	artifact label	Label text discusses bone rotting.		Sometimes under wet conditions bones can rot like a piece of wood as portrayed in these examples. When paleontologists see this type of change to fossil bones we know that the bone was exposed to either great humidity or to wet conditions such as a lake or mud. (BG) The texture on this bone is lumpy, not like the smooth surface of other non-rotted bones. other examples tk artifact labels	theropod tibia, sauropod vertebral fragment A1713; Allosaurus humerus A1063	body outline w. bone
	PW5.E03.ar16	artifact label	Label text discusses bone in nodules.		Nodules made of calcite are common in the quarry. These very hard rocks are started by bacteria breaking down meat from around bones, which increases the pH of the area. Then calcite that naturally flows through ground water or in pond water will form around the bone or groups of bones. If this interpretation is true, then it may mean that there was still lots of meat on the dinosaur bones when they were buried. (BG) artifact labels Caudal vertebra surrounded by calcite nodule	caudal vertebrae in calcite nodule, other examples to be selected	body outline w. bone
	PW5.E03.ar17	artifact label	Label text discusses articulated segments.		Not all of the carcasses found in CLDQ are scattered. Some sections of bodies are found to be in articulation. Articulation is the way the bones would have fit together during the animals life. Most of the sections found articulated were tail vertebrae. (BG) artifact labels (need more info) What other info is needed. Barosaurus tail series Allosaurus caudal vertebrae	Barosaurus tail series A0464, 465, 466, 467, 468, 388?, Allosaurus tail vertebrae	body outline w. bone
	PW5.E03.ar18	artifact label	Label text discusses associated carcasses.		Even though the map makes all of the bones look jumbled there are large amounts of bone close together that go to one animal. This tells us that the animals were not completely mixed up after death, and that some carcasses were allowed to decay with minimal disturbance. (BG) artifact label This partial juvenile allosaur skull was found in near-articulation demonstrating that it was buried before it completely decayed.	Allosaurus partial skull Maybe add an associated pelvis.	body outline w. bone

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	PW5.E03.ar19	artifact label	Label text discusses pathologies.		Pathologies, not clues to the taphonomy Just like humans and animals today, dinosaurs broke legs, got infections and diseases that left marks on their bones. Shown here are examples of Allosaurus bones from the CLDQ that show maladies. Paleontologists do not use these examples of injury to decipher the mystery of CLDQ because the Allosaurus was injured well before it died in Emery County. When a bone breaks or is infected, the body makes the area swell with more bone and once the injury is alleviated the body slowly reabsorbs the bone. (BG)	Allosaurus toe bone A1068, Allosaurus foot bone A1070, fused vertebrae A1071, other examples to be selected	body outline w. bone
	PW5.E03.ar20	artifact label	Label for Allosaurus foot bones.		This is an infected toe bone from an Allosaurus. Notice how the bone has grown very large and lumpy. This foot bone has a large lump on the middle shaft. This may be caused from a small fracture to the bone during running or fighting. These vertebrae are fused together for an unknown reason. They are possibly diseased as opposed to injured.		body outline w. bone
	PW5.E03.fp03	focus panel	Focus panel discusses allosaur growth and age distribution		Determining the age of the animals preserved in fossil bonebeds is important because it can give clues to the mode of death, as well as some behaviors. For instance, if the dinosaurs in this quarry were of different age groups, one migh suggest that they represent a herd and died in a quick flash flash flood or volcanic eruption. If, however, there is a missing age group, then something else could have happened. The CLDQ has more juveniles than adults. We determine which ages are present by comparing the number of one type of body element. (BG)		body outline w. bone
	PW5.E03.ar11	artifact label	Label for Allosaurus series			Allosaurus ilia A0874	body outline w. bone
	PW5.E03.fp04	focus panel	Focus panel discussed the diversity of CLDQ dinosaurs, and what clues that gives us.	There are nine kinds of dinosaurs known from Cleveland-Lloyd, and most are meat-eaters.	There are nine species of dinosaurs found at the CLDQ. Two-thirds of the bones uncovered are from Allosaurus, the largest carnivore of the Jurassic period. Also present are plant-eating Stegosaurus, Camarasaurus and Camptosaurus. Two small carnivores found at the quarry areas Stokesosaurus and Marshosaurus. Barosaurus is another long-necked dinosaur found at the quarry. A nearly complete theropod skeleton of the first Ceratosaurus denticulatis is known from the site, which happens to be the type specimen of the species. And a single arm bone (Humerus) from the large carnivore Torvosaurus is known. Where is the rest of the skeleton?? This is an unusually high percentage of predators; they probably only made up 10% of the total dinosaur population in life. (BG)	Stokesosaurus, skull, Camptosaurus skull, Allosaurus skull, Barosaurus skull, Stegosaurus skull, Camptosaurus skull, Coelurus skull, Torvosaurus skull	fleshed out images of all dinosaurs from CLDQ; illustration/diagram of juvenile and adult Allosaurus (compare to adult and child human)
	PW5.E03.ar01	artifact label	Label for Camptosaurus cast skull		This is Camptosaurus, a plant eater that walked on two legs and was an ancestor to the duck-billed dinosaurs.	Camptosaurus cast skull A0836	body outline w. bone
	PW5.E03.ar02	artifact label	Label for Stokesosaurus cast skull		Stokesosaurus was a small carnivorous dinosaur known from fragmentary remains here at the quarry.	Stokesosaurus cast skull A0830	body outline w. bone
	PW5.E03.ar03	artifact label	Label for Ceratosaurus cast skull			Ceratosaurus cast skull A1045, A0828	body outline w. bone
	PW5.E03.ar04	artifact label	Label for Camarasaurus cast skull			Camarasaurus cast skull A0834	body outline w. bone
	PW5.E03.ar05	artifact label	Label for Barosaurus cast skull			Barosaurus cast skull A0833	body outline w. bone
	PW5.E03.ar06	artifact label	Label for Coelurus cast skull			Coelurus cast skull A0831	body outline w. bone
	PW5.E03.ar07	artifact label	Label for Stegosaurus cast skull			Stegosaurus cast skull A0833	body outline w. bone
	PW5.E03.ar08	artifact label	Label for Torvosaurus cast skull			Torvosaurus cast skull A0827	body outline w. bone

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	PW5.E03.ar09	artifact label	Label for Marshosaurus cast skull			Marshosaurus cast skull A0829	body outline w. bone
	PW5.E03.ar10	artifact label	Label for Allosaurus cast skull			Allosaurus cast skull A0826	body outline w. bone
	PW5.E03.ar21	artifact label	Label text discusses what is missing.		There are several animals that are normally found in an ecosystem that do not appear in the CLDQ assemblage, such as aquatic animals. One crocodile tooth was found in the quarry. Turtle shell from one or two turtles was also found. Since these animals are found in aquatic environments…Where are the other aquatic animals? No fish or amphibians have been found. Could this be a clue to the puzzle? (BG) artifact labels This is the only Crocodile tooth from CLDQ. These are examples of turtle shell found in the CLDQ. They are from the extinct turtle Glyptops.	crocodile tooth, turtle scutes A1066, 1670, 1671, 1672	body outline w. bone
	PW5.E03.ar22	artifact label	Artifact label explains what we learn from CLDQ sediments.	We study the sediments at the quarry to find out about the environment when the dinosaurs lived.	The sediments found at the quarry indicate what the environment was like at the time they were deposited. They show that CLDQ was a floodplain pond. The fossils occur in a 1-m-thick fine-grained calcareous mudstone This type of rock is not characteristic of a river channel or a levee. BG, "no limestone either" Suarez's work and alternating mudstones and limestones? how much detail to give here?		
	PW5.E03.ca08	case	Visitors walk over a Cleveland-Lloyd quarry recreation with bones floating free of matrix and learn about the environment of deposition and taphonomy: deposition and taphonomy	The quarry is a complex jumble of bones. All types and sizes of bones are present.	This is what the quarry would look like if all of the sediment were removed from the ground but the bones remained in their place. Notice how complex the layout is. That is why it takes so much data for paleontologists to decipher a quarry mystery.		
	PW5.E03.gi05	graphic image	Quarry map with highlighted areas accompany the recreation		caption for map, artifact ids		
	PW5.E03.pm01	photo mural	Cleveland-Lloyd quarry map photomural: distribution and taphonomy		caption for map: date, scale		
PW7 Paleo-Prep Lab							
PW7.E01 Window into the Lab			Visitors view the lab through a large window; they can watch a video about preparation, and leave questions for the prep lab staff. There is a step for younger visitors to stand on so they can see into the lab.				
PW7.E01.gr01		graphic rail					
	PW7.E01.ms01	mindset	Mindset text describes the process of preparation, illustrated with a photo series of field to cleaned up fossil	Uncovering and piecing together fossil bones is a long, slow process. Staff and volunteers are working on unveiling some of the museum's latest finds.	Look through the glass wall into the lab. The glass controls the dust, noise and ventilation, but lets you see such apparatus as the huge fume hood used to work with epoxy and solvents. You can also see the wheeled A-frame lifting system that moves fossil-bearing rock into working position. In the rear of the lab is the sand box used in holding pieces of bone together while the glue resets the bones. All the systems needed to operate a working laboratory have been installed: electricity, plumbing, a sink to wash specimens, and a pneumatic line for air tools. (this is from the description of the Carnegie lab; to be revised when lab layout and equipment is finalized)		

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
					Fossil preparation techniques have remained the same for a hundred or so years. You need to remove the matrix (surrounding rock) by scraping, grinding, or dissolving it with acids. Then you need to stabilize the fossil material. The tools to do this include hand-held scrapers, picks, hand-held grinders, air-abrasive units, water guns, acids for dissolving soluble matrix, stiff and soft brushes to remove rock and dirt particles, and glues and stabilizers.		
	PW7.E01.av01	av	Paleo prep AV (existing: A Fossil's Journey)				
	PW7.E01.gc01	graphic caption	running time and title				
PW7.E01.gr02		graphic rail					
	PW7.E01.gp01	graphic panel	Update-able panel to tell visitors about new projects and work going on in the lab		pending ongoing work		
	PW7.E01.sp01	story panel	Story: preparator, collections manager or volunteer on hardest/longest/most rewarding preparation job; why being a preparator is so great				
PW7.E01.gr03		graphic rail			caption: running time and title		
	PW7.E01.in01	interactive - talkback board	Visitors can leave questions for the preparators on a bulletin or "talk back" board; this could also be a place for preparators to post photos and ongoing projects.				
	PW7.E01.ap01	activity prompt	Prompt encourages visitors to leave a question for the preparators				
PW8	**Earth Lab**		The Earth Lab is both a classroom and an exploration space. The lab features an interactive wall with blown up diagrams of a map of the state of Utah, the rock cycle and the geologic time scale. Visitors can manipulate magnetic puzzle pieces related to these concepts. The mineral collection can be taken out from the cabinet and examined under magnifiers.				
PW8.E01							
	PW8.E01.gp01	graphic panel	Mineral characteristics graphic				
	PW8.E01.gc01	graphic captions					
PW8.E02		Triassic Plants	fossils of Triassic plants from Utah are displayed in the cabinets and can be taken out and used for docent facilitated programs.	Before the rise of flowering plants, forests were filled with relatives of today's ferns and conifers.	Triassic Plant Fossils 250 to 200 million years ago Triassic forests include lush ferns, conifers, and cycads.	tbd	

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	PW8.E02.ms01	mindset	Mindset text describes Triassic forests.	Forests have not always been made up of the trees humans associate with forests. In the distant past, such as near the beginning of the Mesozoic, forests were made up of gymnosperms and more commonly tree ferns.	Forests have not always been made up of the trees humans associate with forests. In the distant past, such as near the beginning of the Mesozoic, forests were made up of gymnosperms and more commonly tree ferns. These plants would have been the base of the Triassic food web. (BG) A note on plant fossils - you rarely find the whole plant, you find parts. Scientists give these parts different names, and sometimes eventually the parts are found to belong to a single plant. This is why the bark and the leaves of a plant might have different names. And on the plant fossil record, all major groups of seed plants (as opposed to ferns and their allies, which reproduce by spores) except flowering plants had appeared by the Triassic.		reconstructed scene with plants
	PW8.E02.ar01	artifact label	Label text describes ferns.		Many different types of small ferns lived in the southwest 225 Ma. These ferns lived in much the same way that ferns today live. They needed lots of water and produced spores. Some ferns grew to tree size. They had distinctive bark and sturdy trunks. Artifact ids BG - can you see the spores? would be nice to point out to visitors	fern leaves A1882, 1881, 1567 and wood A1883	
	PW8.E02.ar02	artifact label	Label text describes gymnosperms.		Conifer type trees were becoming common, replacing the ferns from the Paleozoic. (BG) The Chinle formation outcrops frequently in Utah and Arizona. It is best known from the Painted Desert region where its striking displays of reds, greys, tans, yellows and lavender are prominently displayed. Better known than the formation itself are the countless petrified trees found within it, primarily in the lower Petrified Forest member. Many of the trees seem to have been washed in by floods, and show signs of water wear.	tree trunks A1844, 1884, 1885, 1886, 1887, 1888, 1889	
PW8.E03							
	PW8.E04.pm01	photomural	photomural of Rock Cycle				
	PW8.E04.gi01	graphic image	Geologic time scale and map of Utah				
	PW8.E04.gi02	graphic image	Map of Utah				
	PW8.E04.gc01	graphic caption					

SKY

Observing our sky, day or night, helps us appreciate our connections to weather and climate over time.

1. Weather and other celestial phenomena impact earth's systems in a variety of ways. Behavior, adaptation, and culture have all been influenced by astronomical and atmospheric events.

2. While weather is in large part a global phenomenon, Utahns experience four seasons and Utah communities experience weather caused by particularities of elevation, topography, and aspect.

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
SK1 Introduction			Visitors see a glowing rainbow of light projected across a scrim panel. They find that this rainbow is actually reflected from a projection of the sun.				
	SK1.E01.ip01	intro panel	title, grabber, text block	Weather is important to our daily lives; we try to predict it, and wonder how climates will change over time.	People have always been fascinated with the sky - whether a night sky dazzling with stars, or the bright blue sky of a Utah summer day. What we think of as sky is just one of the layers of the earth's atmosphere. Weather takes place In the 6-mile-thick layer closest to earth. "Weather" refers to the state of the atmosphere with regard to temperature, cloudiness, rainfall, wind, and other meteorological conditions. In this exhibition, you'll see the surface of the sun, watch weather from the weather station on the terrace, and see how Native peoples view the night skies.		
SK2 Helioscope			Visitors see a real-time image of the sun projected on the table top and spectral projection on a moveable exhibit panel.				
	SK2.E01.sx01	special exhibit	Spectral Projection	Rainbow image of solar spectrum			
SK2.E02.tt01		tabletop					
	SK2.E02.sx01	special exhibit	Solar Image	Helioscope and heliostat projection			
	SK2.E02.fp01	focus panel	Focus panel explains the heliostat and the helioscope.	You're looking at a real-time projected image of the sun's surface; if you're lucky, you'll see evidence of solar activity.	A heliostat is a light channelling system that uses mirrors to project sunlight into a building. The heliostat tracks the sun's movement, so that the image of the sun can be transferred to the helioscope. The helioscope projects the image of the sun's surface onto this table. Look for dark spots and flares, evidence of solar activity. Solar activity create the weather than can disrupt satellites in space and technology on earth. Sunspots and flares are caused by magnetic storms on the Sun's surface.		photos of sun's surface showing sunspots, storms, flares
	SK2.E02.gi01	graphic image	photos of sunspots and flares for comparison				
	SK2.E02.gc01	graphic caption	graphic caption				
SK3 Utah's Dynamic Climate			Visitors see a chart of climate change over time, and images of Utah weather. They can look at feeds from local weather stations, and post their extreme weather story along the wall's talkback surface.				
SK3.E01.gp01		graphic panel					

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	SK3.E01.ms01	mindset panel	Mindset panel discusses climate change in Utah	Human activities are changing the chemistry of the atmosphere, which will lead to changes in weather and climate.	Utah's climate has changed over the past 100 years, and may change more in the next century. Different models offer different predictions. One group predicts that by 2100 temperatures in Utah could increase by 3-4°F in spring and fall (with a range of 1-6°F), and by 5-6°F in winter and summer (with a range of 2-10°F). A warmer climate could result in less winter snowfall, more winter rain, and faster, earlier spring snowmelt. A panel of 8 Utah scientists agreed recently that * Warming is real and there is "very high confidence" human activities are to blame. * Utah can expect to warm faster than other parts of the world, resulting in fewer frost days, longer growing seasons and more heat waves. * If the trend continues, there will be a decline in the state's snowpack and a threat of severe and prolonged droughts. http://yosemite.epa.gov/OAR/globalwarming.nsf/UniqueKeyLookup/SHSU5BWJ38/$File/ut_impct.pdf http://www.met.utah.edu/news/global_warming_2007		
	SK3.E01.gi01	graphic image	Timeline chart of highs and lows (temperature, snowfall, rain)				timeline of climate change and recent Utah weather
	SK3.E01.gc01	graphic caption	Captions for chart				
SK3.E01.gr01		graphic rail					
	SK3.E01.in01	interactive - talkback	Talkback station invites visitors to say what they were doing on an extreme weather day				
	SK3.E01.ap01	activity prompt	Prompt for talkback				
	SK3.E01.fp01	focus panels	Weather extremes				
	SK3.E01.gi02-06	graphic image	Photos of weather extremes				
	SK3.E01.gc02-06	graphic caption	Captions for images of weather extremes				
	SK3.E01.ic01	inset case	Inset case w/extreme weather object-fulgurite			fulgurite	
	SK3.E01.ar01	artifact label	Artifact label for fulgurite		Tubular shape of glassy rock created when lightning strikes and fuses dry, sandy soil. Tubes can be up to a couple of cm in diameter and meters long. Their color depends on the composition of the sand they formed in, ranging from black and tan to green or translucent white. Local info. here-		
	SK3.E01.fp02	focus panel	Focus panel explains lake effect	The Great Salt Lake acts as a heat reservoir, and intensifies winter storms.	"Lake effect" storms happen in fall or spring when a cold air mass moves in over the warmer Great Salt Lake. The rising warm air from the lake hits the cold air mass above, leading to heavy rain or snow. Wind lifts salt crystals from the lake or nearby salt flats; they become the nuclei for large rain drops or snow flakes. In a lake effect storm, it's possible to get 2 feet of snow in Salt Lake City.		diagram of lake effect, photo of dramatic snowfalls

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	SK3.E01.gi07	graphic image	lake effect diagram				
	SK3.E01.gc07	graphic caption	Caption for lake effect diagram				
	SK3.E01.gi08	graphic image	Image of greatest snow on earth				
	SK3.E01.gc08	graphic caption	Caption for "greatest snow on earth" images				
	SK3.E01.gi09	graphic image	Snowflake formation graphic images				
	SK3.E01.gc09	graphic caption	Caption for snowflake formation				
	SK3.E01.av02	AV	Snowflake film (existing)				
	SK3.E01.in02	interactive	Plastinated snow crystals and magnifier				
	SK3.E01.ap02	activity prompt	Prompt for snow crystal viewing				
	SK3.E01.qt01	quote	Quote about observing or predicting weather; about importance of weather to people				
SK3.E01.gp02							
	SK3.E01.fp03	focus panel	Focus panel discusses weather prediction and Utah and Salt Lake City weather.	Weather is changeable and difficult to predict-everyone has a weather story.	We make a lot o decisions based on the weather forecast. You can probably predict that a February day here would be cold and maybe snowy, while a day in August would be hot and dry. But how about predicting tomorrow's weather? Meteorologists rely on computers to bring together information from weather satellites and local weather stations and make predictions. Weather forecasts have become more accurate largely due to weather satellites and computing power.		
	SK3.E01.av01	av	A monitor displays feeds from local weather instruments including two operated by RT/K and one (solar operated) at Range Creek. Attract screen is time lapse photography of Utah weather systems (available from meteorology department via John Horel).				
	SK3.E01.fl01	family label	Family label about weather and what to wear	Do you put on different clothes on rain days and sunny days?	How do you decide what to wear (besides your favorite color). Clothes help keep us cool on hot days, warm on cold days, and dry on rainy days. Pick the right outfits for the kids to wear!		illustration of kids w. weather visible through window and choice of outfits
	SK3.E01.gi10	graphic image	Dress magnetic silouette with weather-appropriate clothing.				
SK4 Astronomy			Visitors see a giant photomural image of the night sky, and see how western and native star charts differ.				
	SK4.E01.pm01	photomural	Photomural of night sky enhanced to show as many elements of the solar system as possible				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	SK4.E01.ms01	mindset panel	Mindset panel describes astronomy, our solar system, the universe.		Astronomy is the science of celestial objects, like stars, asteroids, comets and planets, and phenomena. If you like to watch the night skies, you can be an astronomer. Amateur astronomers have made major contributions to astronomy, especially in finding new comets. What's up there? Using a regular telescope, you'll see parts of our solar system (the planets, moons, dust, and asteroids that orbit the Sun). Astronomers use an array of scopes that detect different wavelengths of light to see farther out in the universe.		
SK4.E01.ic01		inset case	Inset case w. moon rock, asteroids				
	SK4.E01.ar01	artifact label	artifact label for moon rock and aseroids				
	SK4.E01.gi01	graphic image	Star map w. constellations				
	SK4.E01.gc01	graphic caption	Caption for star map				
	SK4.E01.gi02	graphic image	Native star chart w/ constellations				
	SK4.E01.gc02	graphic caption	Caption for native star chart				
SK4.E01.ic02		inset case	Inset case w/native representations of celestial objects- moon mask			A0397	
	SK4.E01.ar02	artifact labels	artifact label for moon mask and sun mask				
	SK4.E01.sp01	story panel	Story from Cosmic Serpent educator Robert Johnson				
	SK4.E01.gi03	graphic image	Photo of native star party on Navajo res				
	SK4.E01.gc03	graphic captions	Caption for star party photo				
	SK4.E01.sp02	story panel	Paiute story				
	SK4.E01.gi04	graphic image	Anasazi rock art star ceiling image				star ceiling photo
	SK4.E01.gc04	graphic captions	Caption for rock art				
	SK4.E01.qt01	quote	Quote about observing stars, astronomies				
SK5 Terrace			Visitors go outside onto the terrace to look at weather rolling in. They see solar panels and wind turbines, and learn how the museum building is saving and reusing energy. They play the sky interactive game and look at the sky through telescopes, becoming better observers of the world around them. They'll also see some of the weather equipment on the museum roof and learn what it records.				
SK5.E01 Measuring Weather/Sustainable Energy							
SK5.E01.gr01		graphic rail	Measuring weather				
	SK5.E01.fp01	focus panel	Focus panel describes measuring weather	Temperature, wind speed, wind direction, humidity, and atmospheric pressure are all indicators of weather.	What we perceive as the day's weather is actually a combination of factors. These are measured at weather stations on the earth's surface using instruments like thermometers and barometers. There is an array of these sensor on the museum roof, so the museum is a weather station.		
	SK5.E01.ar01	artifact label	Label for temperature and humidity sensor and radiation shield		Thermometers measure air temperature.		photo of equipment
	SK5.E01.ar02	artifact label	Label for pressure sensor		A barometer measures air pressure. The weight of the air above an object exerts a force per unit area upon that object and this force is called pressure. Variations in pressure lead to winds.		photo of equipment
SK5.E01.gr02		graphic rail	Measuring weather				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	SK5.E01.ar03	artifact label	Label for solar radiation sensor				diagram of equipment
	SK5.E01.ar04	artifact label	Label for rain gauge				photo of equipment
	SK5.E01.ar05	artifact label	Label for snow measurer				photo of equipment
SK5.E01.gr03		graphic rail	Measuring weather				
	SK5.E01.ar06	artifact label	Label for wind monitor		Anemometers measure wind speed and direction.		photo of equipment
	SK5.E01.ar07	artifact label	Label for wind turbine		pending turbine info To make enough electricity to serve lots of people, power companies build "wind farms" with dozens of huge wind turbines. Wind farms are built in flat, open areas where the wind blows at least 14 miles per hour; they can be onshore or offshore. This is a residentiar turbine; it could power_____		
SK5.E01.gr04		graphic rail	Renewable Energy				
	SK5.E01.fp02	focus panel	Focus panel explains renewable energy.		Renewable energy is energy generated from natural resources—such as sunlight, wind, rain, tides and geothermal heat—naturally replenished (unlike coal and gas which are finite resources). Wind power is one of the fastest growing renewable energy sources. Turbines like this one convert the wind's kinetic energy into electricity. Photovoltaic cells convert the sun's energy to electricity. The museum building has arrays of similar panels on the roof, so the building helps generate energy to power lights and exhibits.		
	SK5.E01.ar08	artifact label	Label for solar panel		pending solar panel info		
	SK5.E01.ar09	artifact label	Label for green roof				diagram of roof, close-up photo of plants
SK5.E01.gr05		graphic rail	Sun Angle				
	SK5.E01.gi01	graphic image	Diagram of sun angles				
	SK5.E01.gc01	graphic caption	Caption for sun angle diagram				
SK5.E01.gr06		graphic rail	Inversions				
	SK5.E01.fp03	focus panel	Focus panel explains inversion	The topography of Salt Lake Valley can magnify air pollution.	On windless winter days, warm air above sometimes traps colder air down in the valley, causing a temperature inversion. Usually, the higher elevation you are, the colder the air, but this is the opposite. When that happens, city smog has nowhere to go. Standing on a hillside looking down into the valley, the inversion can look like a blanket of white. Much of that http://www.acfnewsource.org/science/olympic_air.html		
	SK5.E01.gi01	graphic image	diagram of inversion; photos of clear and inversion days (ideally from museum looking out)				
	SK5.E01.gc01	graphic caption	caption for inversion diagrams				
SK5.E02 Observing Weather							
SK5.E02.gr01		graphic rail	Panoramic viewshed with sunset positions				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	ARTIFACTS/ SPECIMENS	GRAPHICS
	SK5.E02.gi02	graphic image	Sunset calendar				images of sunsets at different times of the year from museum site
	SK5.E02.gc02	graphic caption	Caption for sunset photos				
	SK5.E02.gp01	graphic panel	graphic panel for cloud types		A cloud consists of water particles or ice crystals floating in the atmosphere. There are 10 different types of clouds. Spin the wheel to find a match for the clouds in the sky. Stratus clouds are spread out, dull clouds usually found at ground level. Stratus clouds are so close to the ground they are identified as fog. Cumulonimbus clouds are piled up high like scoops of dark ice cream. These clouds usually bring rain showers. Cumulus clouds look like giant heads of cauliflower because they are white and fluffy. Dark, flat nimbostratus clouds often produce rain or snow. Stratocumulus clouds are spread out heaps of dense cover that rise higher in the atmosphere. Altocumulus and altostratus are middle-altitude clouds. Even though the word alto means "height" in Latin, these are not the highest clouds. Altocumulus clouds look fleecy and have dark, shadowed sides. Altostratus clouds are flat and make the sun look as if it is being seen through a misty glass. Clouds forming in high altitudes are called cirrus, cirrostratus, and cirrocumulus. It is so cold in the upper atmosphere that high altitude clouds contain ice crystal Cirrocumulus clouds look like upside down waves rollin High, thin cirrostratus clouds look much like stratus clou Cirrus clouds form when the wind blows these ice crystals into wispy streaks that look like thin horse tails. verbatim from ASU's website http://chainreaction.asu.edu/weather/digin/clouds.htm		photos of different clouds
SK5.E02.sx01		special exhibit	North star direction diagram embedded in floor; viewscope to North Star				
	SK5.E02.sp01	story panel	Story for North Star				
SK5.E02.gp01		graphic rail					
	SK5.E02.in01	interactive - sky color	Sky Mosaic interactive	Look closely at the sky - can you match the color to one of the color tiles.	What you see: a box of color tiles and a framework with some tiles on it. What you do: pick a tile that you think matches the color of the sky and add it to the mosaic framework; you can personalize the back of the tile with words or sketches What you get: better observing skills, a challenge to find a color that matches the sky, and a feeling of participation in building the group mosaic.		
	SK5.E02.ap01	activity prompt		Match a color tile to the sky, and add it to the sky mosaic.			

UTAH FUTURES

If we can learn from the past and foster our connections to Utah's natural world, we can make informed decisions about a healthy global future.
1. We are connected to the world in ways you may not have imagined. Deep connections with the place we live can help us to understand broader connections globally.
2. The past and the present inform us about our future.
3. Through your decisions and actions, you do change the world.

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS
UF1Introduction		title wall				
	UF1.E01.ip01	introduction panel	title, grabber, copy block	We can forge a sustainable present and future.	The Utah Museum of Natural History is committed to operating under and promoting sustainability, that is, meeting the needs of the present without compromising the ability of future generations to meet their needs. Residents of this state, like many Americans, realize that the land is under pressure, demands on resources are increasing, open spaces are being lost. What kind of life do we want for ourselves and our children? Can we find a balance in how we live? In this exhibition, you will see how the museum's collections speak to today's challenges, and meet Utahns who are working for a sustainable present and future. An additional may be developed with Simon Heidjens; involving artifacts and/or environmental responses	
UF2 The Carbon Story						
UF2.E01.ca01		case	Visitors see a case with artifacts that don't seem to be related - what's the connection? They learn that these objects from the collections relate to the carbon cycle.			Allosaurus Left maxilla #a0875, Calcite Cave formation #a1080, Azurite #a1221, Gambel oak herbarium sheet #a1748, Palmatid2 #a1769, Calcite #a1800, Aragonite #a1801, Cheyenne Jacket w/ Beaded Horses #a1802, Hopi Rain or Wedding Sash #a1803, Ammonite #a1869
	UF2.E01.ms01	mindset panel	Mindset panel explains the carbon cycle.	All life is based on the element carbon. Carbon is the major chemical constituent of most organic matter, from fossil fuels to the complex molecules (DNA and RNA) that control genetic reproduction in organisms	Carbon is a substance that cycles through our world, largely unseen. It feeds us, warms us, provides shelter, propels us from place to place, and changes our climate. Carbon is everywhere - in our bones and teeth, in other living things, and in the non-living world. Carbon cycles between living things and the non-living world, where it's found as CO2 in the atmosphere and oceans, in limestone rocks, and in coal and gas. Today the C02 in the atmosphere is steadily increasing, leading to global climate change.	
	UF2.E01.gc01	graphic caption	Captions for carbon cycle			
	UF2.E01.gc02	graphic caption	Captions for carbon dioxide charts			
	UF2.E01.fp01	focus panel	Focus panel explains how plants capture carbon.	Plants absorb carbon dioxide from the atmosphere, and through photosynthesis carbon atoms are incorporated into carbohydrates, or sugars.	Most carbon enters the living world through photosynthesis, the process where plants convert carbon dioxide and water to sugars and oxygen. Animals eat the plants and use the carbon in the sugars for energy and to build their bodies. Other animals eat these animals, and the cycle continues, with carbon eventually returned to the soil after the animals die. The same carbon atoms are recycled endlessly over millions of years.	

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS
	UF2.E01.ar01	artifact label	Label for Plant voucher, Quercus gambelii (Gambel oak		These two specimens provide the opportunity to discuss the nature of carbon sequestration over millennia in the fossil form of the plant and over the shorter term in the living pressed plant.	A1748
	UF2.E01.ar02	artifact label				A1769
	UF2.E01.gc03	graphic caption	Graphic caption explains deforestation		By clearing forests, humans reduce the ability of photosynthesis to remove CO2 from the atmosphere, which results in a net increase in atmospheric CO2. Because of these human activities (including burning of fossil fuels), atmospheric carbon dioxide concentrations are higher today than they have been over the last half-million years or longer.	
	UF2.E03.fp02	focus panel	Focus panel text links clothing with the carbon cycle.	The very same carbon taken from atmospheric CO2 by plants is eaten by herbivorous animals to make muscles, skin, hair, or otherwise create/maintain their bodies. Humans use these materials to make clothing.	The carbon within the plant leaves, stems, and sugar are broken down, and then utilized within protein, fat, and other molecules of the deer to help grow muscles, hair, bone, skin, etc. and maintain and repair its body. The deer leather vest here is made of the exact Carbon atoms that the deer ingested from the plants in its forest. Virtually all clothing is made from some sort of Carbon-based material, including this cotton shirt. CO2 from the atmosphere is used with sunlight to produce the cotton within this shirt. The deer vest and the cotton shirt are ultimately produced by sunlight and atmospheric CO2. Our life, and all of those impacted by us, is dependent on a delicate balance between energy and matter.	
	UF2.E03.ar03	artifact label			Let's chose an object that includes both a beautifully tanned hide and imagery of plants or animals in beadwork. Then the caption can refer to indigenous traditional ways of honoring the gifts of the natural world. If we chose to go with a parching tray, we can address the changes in range and productivity of pinons--a climate change story.	Embellished clothing made of deer hide and or basket. A1802 Cheyenne jacket, A1803 Hopi rain sash
	UF2.E03.gc04	graphic caption	Caption for contemporary bear dance photograph or pine nut winnowing photograph			
	UF2.E05.fp03	focus panel	Focus panel describes carbonates.	Carbonates act as carbon "sinks" storing carbon in rocks and underwater.	Over long time-scales carbonic acid (a weak acid formed by reactions between atmospheric carbon dioxide, CO2, and water) slowly combines with minerals at the earth's surface. These reactions form carbonates (carbon-containing compounds) through a process called weathering. Large beds of limestone around the world are filled with invertebrate shells made of Calcium carbonate. These shells were made from CO2 in ocean water.	
	UF2.E05.ar04	artifact label	Label for carbonate mineral specimen			A1080 calcite, A1221 azurite and malachite, A1800 calcite, A1801
	UF2.E05.ar05	artifact label	Label for ammonite			A1869 ammonite
	UF2.E05.gc05	graphic caption	Graphic caption about the effects of pollution on limestone.		Air pollution from cars and from industrial activity is causing air pollution which also causes damage to limestone structures and statues.	

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS
	UF2.E06.fp04	focus panel	Focus panel describes how the analysis of carbon can help scientists identify dinosaur diets.	Carbon is used to identify the diets of ancient creatures.	The carbon cycle has been working for several billions of years. Ancient plants utilized atmospheric CO2 in similar ways that plants do today. Herbivorous animals, such as dinosaurs ate the plants and utilized the carbon in their bodies. Carnivorous dinosaurs then ate the herbivores. Scientists can study the diets of dinosaurs by studying the carbon within their teeth. As the dinosaur tooth grows, it uses the carbon that it obtained from its food to form bone and teeth. By analyzing that original carbon, which is still preserved in many fossil teeth, we can begin to understand which carnivores ate which herbivores, and if certain herbivorous dinosaurs preferred certain types of plants or places of feeding.	
	UF2.E06.gc06	graphic caption	Caption describes graph of isotope rations			
	UF2.E06.ar06	artifact label	Label for Allosaurus material			A0875 Allosaurus maxilla
	UF2.E06.ar07	artifact label	Label for Camarasaurus material			
UF3 Sustainability			Visitors gather in the center of the space to play the sustainable card game or interact with the choices game, choosing an icon to trigger questions about life choices and reactions that result form various kinds of impact. Billboard style poster panels with inset cases are themed according to science, economics, and community. These panels discuss Utah sustainability efforts, tying to global topics where appropriate. Photographs, stories, and objects from the collections may be included, as well as maps. This is an opportunity to also bring specific place-based stories and projects to the public and offer ways for visitors to get more involved in their communities.	You can make a difference.		
	UF3.E01.ms01	mindset panel	Mindset panel defines sustainability, introduces the 3 pillars.		Balancing the relationships between environmental stewardship, economic development, and social responsibility while meeting the needs of the present without compromising the ability of future generations of people and ecosystems to meet their own needs." Sustainable development is supported by three pillars, representing environmental protection, social development and economic growth, which together support the roof. An additional supporting beam is research. All of these support structures need to be strong and balanced for a sustainable future. This requires partnerships among the institutions of each pillar - locally and globally - nonprofits, governments, activists, researchers, developers, and planners need to be able to work cooperatively.	
UF3.E01.gp01		graphic panel	Science			
	UF3.E01.fp01	focus panel	Focus panel explains sustainable home and garden design, and describes Utah House.	You can build homes and gardens that are energy- and resource-use efficient.	Sustainable homes and gardens use less energy and water, and are made of materials that are friendly to people and animals. A sustainable house can be beautiful, while making little impact on the environment. The Utah House project in Kaysville is a demonstration project for sustainable house and garden design. Utah House is 60% more energy efficient, and uses 70% less water than the average home in the state. It's made from healthy products so indoor air quality is better. The garden is also energy and water efficient, and features native plants.	
	UF3.E01.sp01	story panel	Story from Utah House founder or staffer about impact of the House, future directions.			
UF3.E01.gp02		graphic panel	Science			

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS
	UF3.E01.fp02	focus panel	Focus panel explains ecological footprint and introduces Utah Vital Signs.	Ecological Footprint is a measurement of whether we are living within Earth's resources.	This ecological accounting tool compares a particular human demand on the Earth's biosphere in a given year to the available biological capacity in that year. Such a measure of the supply of and human demand on natural capital is indispensable for tracking progress, setting targets and driving policies for sustainability. The Ecological Footprint of a region includes all the cropland, pasture land, forests, and fishing grounds required to produce the food, fiber, and timber its population consumes, to absorb the wastes emitted ingenerating the energy it uses, and to provide space for its infrastructure. To manage our natural capital wisely, it is important to know how much we have and how much we use. In 2007, Utah became the first state to complete an Ecological Footprint analysis. http://www.utahpop.org/vitalsigns/UVS_Report_v20b.pdf	
	UF3.E01.sp02	story panel	Story from Utah Vital Signs founder or staffer			
UF3.E01.gp03		graphic panel	Economics			
	UF3.E01.fp03	focus panel	Focus panel explains the importance of research and introduces the Utah Clean Coal Program.	Research can help us find ways to live more sustainably.	Research on sustainability looks at energy, climate change,transportation, land use, pollution, and ecosytems, among other areas. Much of this research is focused on practical solutions - ways to mitigate harmful conditions and practices, and products to reduce our impact on the planet. Research also helps monitor changes to local and global systems. Researchers are studying how to change people's behavior, to make them participants in the search for sustainability. The University of Utah has an Office of Sustainability that coordinates and encourages sustainable practices, and supports sustainability research. One of the Office's efforts, the Utah Clean Coal Program, does research on supporting the development of technologies for the clean and efficient utilization of coal and options for the mitigation of CO2 emissions. http://www.uc3.utah.edu/	
	UF3.E01.sp03	story panel	Story from Utah Clean Coal researcher			
UF3.E01.gp04		graphic panel	Economics			
	UF3.E01.fp04	focus panel	Focus panel explains the importance of voting and introduces HEAL Utah.	You have a voice in the future when you vote on green candidates and issues.	Investigate the people who want to be your mayor and local council members. They make decisions that affect your roads, sewers services, garbage, housing and development, public transit and public health. If you want to push for a green agenda, vote for the candidates you think will take serious steps to achieve environmental sustainability. If we hope to be environmentally sustainable globally, we must act locally. HEAL Utah is a nonprofit group working to encourage people to participate in the democratic process to make informed and sustainable decisions about a healthy environment in Utah. http://www.patagonia.com/pdf/en_US/Environmental_Grants_2008.pdf http://healutah.org/who/aboutus	
	UF3.E01.sp04	story panel	Story from HEAL founder or staffer.			
UF3.E01.gp05		graphic panel	Community			

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS
	UF3.E01.fp05	focus panel	Focus panel explains sustainable communities and introduces Daybreak.	Sustainable communities foster energy and social sustainability.	A Sustainable Community iseeks to preserve and enhance people and nature by thoughtful planning, careful use of resources and a reverent approach to life. These attributes create an environment where all may thrive for untold generations. The idea of Sustainable Community is bigger than energy efficiency, it's about encouraging human interaction and interaction with nature. Daybreak Community, in Jordan, is a planned, sustainable community built on surplus mining land. As the Daybreak web site says, "At Daybreak, sustainability means having more balance, more beauty, more connections to nature and your fellow humans. It's about having a better life, today and tomorrow." http://www.centerforsustainablecommunity.org/definesustainability.html http://www.riotinto.com/documents/ReportsPublications/Rio-tinto-sep07-Daybreaks.pdf	
	UF3.E01.sp05	story panel	Story from Daybreak planner or resident			
UF3.E01.gp06		graphic panel	Community			
	UF3.E01.fp05	focus panel	Focus panel explains eating locally and introduces Utah's Own.	You make choices every day about what to buy and where to buy it; these choices affect our future.	The concept of buying local is simply to buy food (or any good or service) produced, grown, or raised as close to your home as possible. "Food miles" refer to the distance a food item travels from the farm to your home. The food miles for items you buy in the grocery store tend to be 27 times higher than the food miles for goods bought from local sources. In the U.S., the average grocery store's produce travels nearly 1,500 miles between the farm where it was grown and your refrigerator. The Utah's Own program was established to create a consumer culture of choosing Utah products at grocery stores, restaurants; everywhere consumers shop. When Utah consumers purchase locally produced products it builds our Utah economy since a dollar spent on a Utah product creates the effect of adding $4.00 to $6.00 to our Utah economy. In addition, when Utah consumers purchase locally grown products it enhances our Utah environment by protecting our watershed and reducing the carbon footprint of those products. http://www.sustainabletable.org/issues/buylocal/ http://www.utahsown.utah.gov/cons_home.php	
	UF3.E01.sp05	story panel	Story from Utah's Own founder, farmers' market organizer or other eat local advocate.			
	UF3.E01.in01	interactive - think cards	Vistors assemble a picture puzzle; each piece has a think question on the back. As they assemble the color-coded cards, visitors find they are building either a sustainable picture for the future or a less sustainable one. The puzzle encourages group interaction and discussion, and makes it clear that there are no right and wrong answers.	Imagine the world you want to live in and learn about what you can to to get there. The choices we make today determine the type of world we live in tomorrow.		
	UF3.E01.ap01	activity prompt	Instructions for card puzzle			
UF3.E01.gr01		graphic rail				
	UF3.E01.in02	interactive - sustainability game	What you see: You approach a metal rail with a set of icons projected on it. On the other side of the rail, on a large curved wall, you see an animated landscape. If you touch and hold an icon, animated messages appear on the landscape scene. For instance, if you touch the car, a highway appears on the landscape. A series of messages appear, exploring the issue of whether we should build more roads. You also see other visitors touching the glowing icons, and what happens to the landscape when they touch a tree, or a factory. Each of the icons and messages is related to a particular Utah issue (development, water, population, etc.) What you get: You find that there are multiple perspectives and opinions about how to achieve a sustainable future.	Your actions and decisions contribute to a sustainable future.		

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS
	UF3.E01.av01	av program	A colorful 3-D animated diorama is a floor-to-ceiling video projection that represents a stylized Utah landscape and is the basis for the sustainability interactive.			
	UF3.E01.in03	interative-talkback	Visitors are invited to leave their thoughts on sustainablility issues, their feelings about the present, hopes for the future and hints and resources for sustainable living.	Your opinion counts - what does sustainability mean to you now? What did it mean in the past and how will it impact our future?		
	UF3.E01.ap02	activity prompt	Visitors are encouraged to share			
	UF3.E01.av02	av program	In a listening booth, visitors have the opportunity to listen to pre-recorded stories about the past and future. Stories about the present can be contributed in two ways- either through post-its in the booth, or by uploading stories onto the UMNH site- either from home or the Canyon.			
UF4 Passage to PW	UF4.E01.qt01	Quote	about the future			
	UF4.E01.qt02	Quote	about the past informing the future			
	UF4.E01.qt03	Quote	about extinctions past and present			